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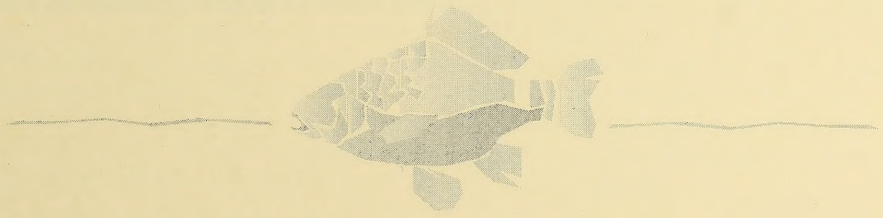
RED DEER RIVER CORRIDOR

INTEGRATED MANAGEMENT PLAN

DRAFT

October 1999



Alberta
ENVIRONMENT

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Executive Summary

Draft Red Deer River Corridor Integrated Management Plan

Purpose of the Integrated Management Plan (IMP)

The planning area contains a mix of private and public land where a variety of jurisdictions, resource managers and private citizens are responsible for management of the corridor's diverse natural resources. The effective and coordinated management of these resources therefore requires that a broad plan or vision be developed to provide resource managers with some common direction to guide their decision making. The purpose of the IMP is to:

- coordinate existing municipal and provincial policies and resource management direction by setting integrated objectives and guidelines for resource managers,
- reduce the number of resource conflicts that might otherwise occur without a plan,
- minimize negative impacts on the environment, economy, communities and lifestyle of the corridor's residents,
- optimize economic opportunities while balancing other interests and values,
- allow the public to confirm that government is managing the corridor in the public's interest,
- help everyone to make better and more efficient land and resource use decisions,
- respect the existing rights of landowners, private mineral rights holders, leaseholders and water rights holders, and
- enable the long term sustainable development of the corridor's resources and communities.

Policy Context

The IMP is strictly a policy document and does not change or supersede any existing provincial acts or regulations. Municipal authority will remain unchanged by any policy direction in the IMP. It will be optional for municipal governments to adopt any IMP policies into their own statutory plans and/or bylaws. Application of the IMP to private land will therefore be at the voluntary discretion of municipal governments and landowners. Provincial resource agencies and managers will apply and implement the IMP's policy direction to provincial lands and resources under their jurisdiction.

Planning Area

The planning area for the IMP begins just west of Sundre and continues east and southward to the Alberta-Saskatchewan border. The planning area boundary is defined by the valley break-of-slope plus a 150 meter setback above the break-of-slope (to a maximum distance of 3 km from the river). The IMP applies to public lands and resources within this boundary.

The planning area is divided into five distinct river reaches that reflect and respect local variations in geography, resources, current uses and interests, while still allowing the coordination of resource management activities in the corridor as a whole.

Process and Participants

The mix of private and public land and resources in the corridor required the collaboration of numerous land management agencies and jurisdictions. Although the IMP is principally written for public lands, effective and integrated management would not be possible without the input and participation of municipal governments and local stakeholders.

Municipal input was facilitated through the formation of a Local Authorities Committee (LAC) which was comprised of representatives from 15 municipal jurisdictions in the corridor. Different provincial government resource agencies responsible for public lands and resources were represented by an Interdepartmental Planning Team. Local stakeholders were consulted at the outset through a series of workshops that were used to identify the values, priorities, issues and interests of those who lived and worked in the corridor. The initial workshops provided direction for the development of the Draft IMP which will undergo a public review before being finalized and implemented.

Management Plan Recommendations

The IMP provides objectives and guidelines for 15 resource management areas such as water, forest, fisheries, mineral, recreation and tourism resources. The first half of the plan provides background information and direction for each resource as it applies to the entire corridor. The remainder of the plan provides further detail on select resource matters as they relate to individual reaches of the river. This reach-specific approach was used to account for the geographic, economic, social and environmental variations along the corridor.

The IMP also makes a connection between land and water management since the two resources are so directly related. The preservation of water quality in the Red Deer River is a high priority and this can only be achieved through careful management of both land and water uses in and along the river valley. Water management issues relating to flow volumes will be specifically addressed in a subsequent planning initiative, the *Year 2000 Review of Water Management in the South Saskatchewan River Basin* (see below).

Related Initiatives

Year 2000 Review of Water Management In the South Saskatchewan River Basin: This initiative will determine the maximum volume allocation limit of water in the entire South Saskatchewan basin, of which the Red Deer River is a significant sub-basin. The allocation limit will consider all water uses. Domestic, municipal, industrial, agricultural, irrigation and instream demands will be examined in detail in setting the limit on allocated water. The Year 2000 Review is presently underway and will include public open houses at key stages in the process.

Special Places: Special Places is a provincial policy initiative aimed specifically at completing the province's system of protected areas. Its goal is to protect representative examples of Alberta's environmental diversity through the completion of a protected areas network. This initiative complements the IMP because it advances the protection and management of public lands which are already recognized for their ecological values and significance. The Special Places initiative is in its final stages and will be completed by the end of 1999.

1.0 - INTRODUCTION

1.1 Purpose of Plan

Resources of the Red Deer River Corridor are regionally, provincially, nationally and internationally significant. Included are historic resources, important natural landscapes, significant agricultural lands, natural habitat critical to wildlife, mineral resources, water resources and extensive tourism and recreation opportunities. Enmeshed with these resource values are numerous existing and potential economic benefits for local communities and the province as a whole. Use of these resources affects both the natural ecosystem of the Red Deer River Corridor and the communities whose economies and lifestyles depend on the corridor's resources. As human activities increase and diversify, so do the demands on these resources.

The purpose of this integrated management plan (IMP) is threefold:

1. **To coordinate and integrate land and resource management in the corridor to provide long-term, integrated management direction;**

2. **To mitigate and resolve conflicts between resource uses and minimize impacts of resource uses on historic and natural resources; and**

3. **To promote sustainable development in the corridor.**

The planning area contains a mix of private and public land and therefore many jurisdictions, resource managers and private citizens are responsible for management of the land, water and related resources. The management and use of a resource for one purpose can affect both the use of that resource for other purposes and the management and use of other resources. This can lead to conflicts which can result in less efficient and effective use of valuable corridor resources. Impacts may include such things as a reduction in agricultural capability, loss of valuable tourism and local recreation opportunities, loss of wildlife habitat, disruption of mineral development, degradation of valuable historic resources, air pollution and negative impacts on aquatic and riparian ecosystems.

Resource agencies, stakeholders and the public need to work together to manage natural resources effectively, to minimize conflict and to maintain the corridor's natural character. By developing this integrated management framework, we can provide guidelines for the coordinated and sustainable management of all resources in the Red Deer River Corridor. Specifically, this integrated management plan will:

- coordinate existing municipal and provincial policies and resource management direction by setting integrated objectives and guidelines for resource managers;
- allow the public to confirm that government is managing the corridor according to the public interest;
- help everyone to make better decisions on the use of land and resources; while
- respecting the existing rights of landowners, private mineral rights holders, leaseholders and water rights holders.

Integration and coordination among resource managers will result in fewer conflicts and promote sustainable development of the corridor's valuable resources. Sustainable development requires that the use of resources and the environment today does not impair prospects for their use by future generations. It also requires that development activities not exceed the capabilities and limits of the environment to sustain itself. Provincial and municipal governments are committed to sustainable development to ensure the prosperity of both local communities and the province as a whole (see *The Alberta Vision of Sustainable Development,* 1992 and *Land Use Policies,* 1996). Public participants in this planning process were very clear in their own version of this message - *protect the natural character of the corridor while ensuring continued, long-term prosperity for its residents.*

This integrated management plan will serve as a tool to assist in the implementation of the province's sustainable development goals. Its guidelines and objectives will provide direction to managers, landowners and other resource users, enabling them to make quality, informed decisions that effectively utilize and protect corridor resources.

In addition to the value of the planning document itself, the Local Authorities Committee (LAC) has acknowledged that the process of developing an integrated management plan is at least as valuable as the final product. The planning process facilitated communications between municipalities as well as between the municipalities and provincial government resource agencies. This collaborative effort raised awareness about land and water issues and practices throughout the corridor and enabled many participants to expand their working knowledge and understanding of integrated resource management. An enhanced understanding of the challenges and opportunities provided by integrated resource management will contribute to improved decision making and sustainable management of the corridor's diverse resources.

Policy Context:

The IMP is strictly a policy document and does not change or supersede any existing provincial acts or regulations. Municipal authority will remain unchanged by any policy direction in the IMP. It will be optional for municipal governments to adopt any IMP policies into their own statutory plans and/or bylaws. Provincial resource agencies and managers will apply and implement the IMP's policy direction to provincial lands and resources under their jurisdiction.

The IMP focuses on matters of public land use policy and not matters of law. With respect to municipal jurisdictions, the plan should be interpreted as providing optional guidelines for municipalities to elaborate on through their own statutory plans and land use bylaws. The IMP is not intended to be the basis of legal challenges.

1.2 Planning Area

The planning area for the Red Deer River Corridor Integrated Management Plan begins just west of Sundre and continues eastward to the Alberta-Saskatchewan border (see Figure 1). The planning area boundary is defined by the valley break-of-slope plus a 150 meter setback above the break-of-slope. In cases where the break-of-slope is more than 3 kilometres from the river, the boundary will be drawn at a 3 km maximum distance. The IMP applies to public lands and resources within this boundary. Any application of the IMP to private land will be at the voluntary discretion of landowners and municipal governments.

The amount of public land tends to increase both upstream and downstream from the City of Red Deer. The majority of this public land is under agricultural disposition including grazing leases and permits, cultivation permits, and Farm Development Leases without option. Other uses of public land include protected areas (provincial parks, natural areas, recreation areas), water treatment and intake sites, well sites, roads and pipelines.

While this plan focuses on the river's main stem and the land and resources within the valley breaks, it is important to recognize that the corridor cannot be managed in isolation. Activities outside the planning area have implications for many resources within the valley. This is especially true for upland areas immediately adjacent to the river valley itself.

The planning area is divided into five distinct river reaches that reflect and respect local variations in geography, resources and current uses and interests, while still allowing the coordination of resource management activities in the corridor as a whole.

Management Jurisdictions

The planning area falls within 15 rural and urban municipalities, including the Towns of Drumheller and Sundre, the City of Red Deer and the Village of Empress. The planning area also lies within two of Alberta Environment's administrative units: Parkland and Bow Regions. In the west, the planning area abuts the boundary of the existing Nordegg-Red Deer Integrated Resource Plan.

Natural Landscape

The planning area lies completely within the Red Deer River Basin which is part of the larger South Saskatchewan River Basin. It is also located in three of the province's six natural regions (Boreal Forest, Parkland and Grassland). These regions are subdivided into five subregions within the planning area: Dry Mixedwood, Central Parkland, Northern Fescue, Mixed Grass and Dry Mixed Grass.

1.3 Process and Participants

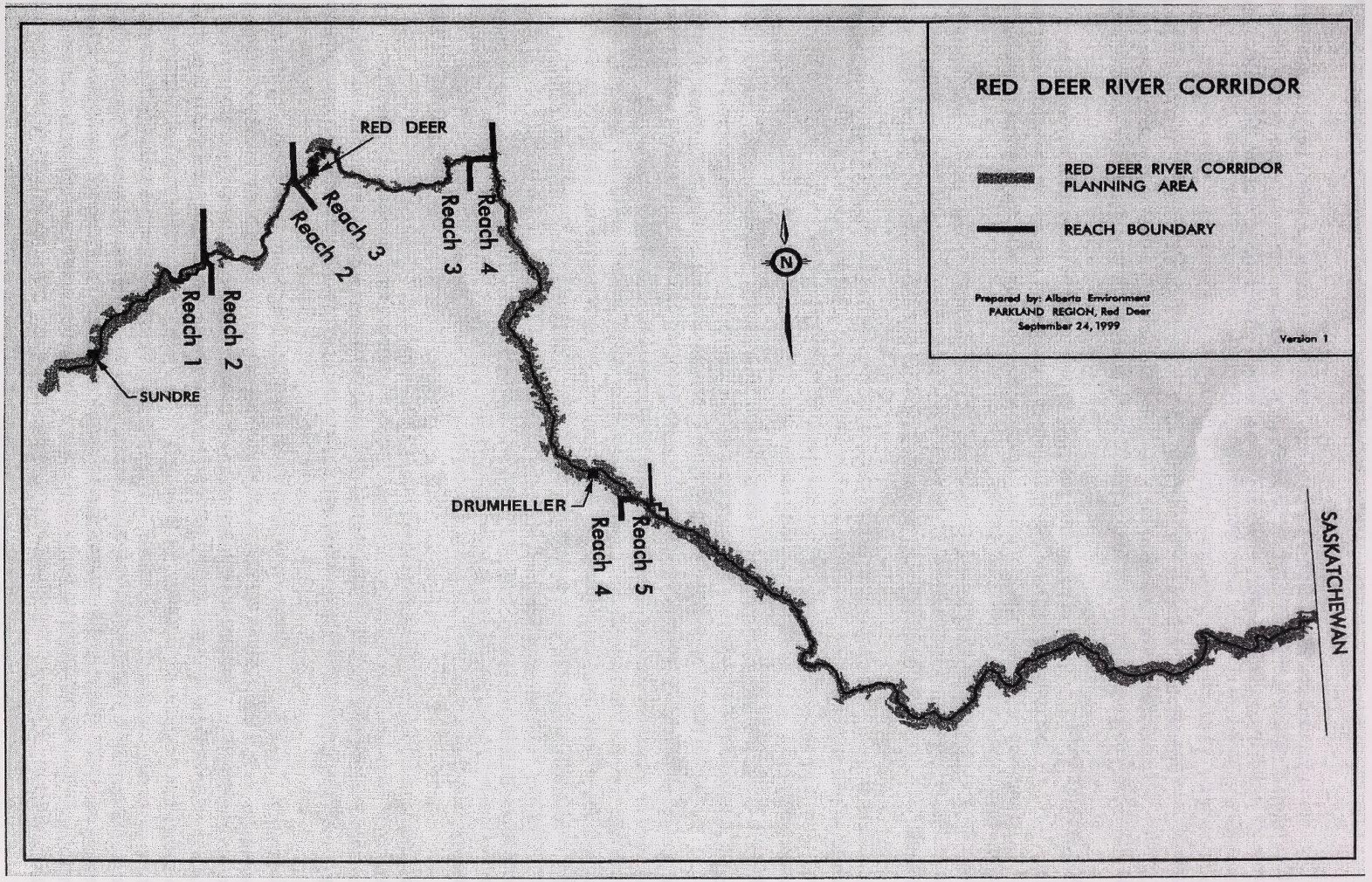
During development of the Central Regional Integrated Resource Plan, the planning team and public stated that an integrated resource plan for water, land and related resources of the Red Deer River Corridor was needed. Background work for an Integrated Resource Plan began in 1993.

During the initial stages of the Special Areas Water Supply Project in 1989, the need to determine instream flow objectives for the Red Deer River was identified as a priority. Background scientific studies of instream needs were initiated in 1991 and completed in 1997.

With the formation of an integrated air, land and water planning program in 1994, the Red Deer River Corridor Integrated Resource Plan and the Red Deer River Instream Flow Needs were combined into a single strategic planning exercise, the Red Deer River Corridor Integrated Management Plan.

The interrelationship and mix of private and public land and resources makes effective management impossible without the cooperation of all agencies involved in the use, administration and management of the corridor's natural resources. The need for a truly integrated plan led to the

Figure 1 - Red Deer River Corridor Planning Area



development of a cooperative partnership between the managers of public land and resources (provincial government) and the managers of private land (municipalities). Local municipalities actively contributed to the development of the Red Deer River Corridor Integrated Management Plan through the Local Authorities Committee (LAC).

Authority

The IMP will have no direct authority on private land which remains a municipal responsibility. After assisting in the development of the IMP, and endorsing those portions relevant to private land, municipalities will be able to apply the plan to resource management decisions as they see fit. One such mechanism for this could be through the municipal Land Use Bylaw and Development Permit Process.

Participants

The plan was developed through an open process with all affected stakeholders having opportunities to participate. The provincial government agencies listed in Table 1.0 are involved in managing public lands and resources in the corridor. Representatives of these agencies have worked on an interdisciplinary planning team as resource experts.

Representatives of 14 municipalities (see Table 1) formed a Local Authorities Committee that worked with the planning team to develop the IMP. The County of Newell did not join the LAC until April of 1998 and was therefore not involved in developing the initial draft plan. The LAC provided ongoing direction on issues relating to private land. Recommendations from interest groups, the general public and industry were also considered in developing the IMP.

Once the plan is completed, ***municipalities will have sole responsibility for applying the IMP to resource management decisions under their jurisdiction.***

Members of the public, including interest groups, industry representatives etc., have been important participants in the planning process. This plan will respect the livelihood and lifestyles of residents in the corridor. The public participated in workshops in the fall of 1993 to identify issues that the plan should address. They have been kept informed through regular updates and have had the opportunity to provide input at any time.

Planning Process

The planning process followed the general planning steps of:

- gathering information and identifying issues;
- analyzing that information and generating alternative solutions or options;
- making decisions or choices for the best management options (objectives and guidelines);

The interdepartmental planning team was responsible for gathering information, analyzing data, generating options and proposing resource management objectives and guidelines. A technical water subgroup evaluated and completed the Red Deer River Instream Needs Study. All of this work has been consolidated in this *Draft Integrated Management Plan*. The *Technical Background Document* contains additional supporting information to assist resource managers throughout the corridor.

The Local Authorities Committee provided ongoing advice on resource management direction, particularly as it related to private land. They are also responsible for endorsing the plan after revisions are made on the basis of public review. The Parkland and Bow Region Environmental Resource Committees (ERC) provide similar direction and approval for the provincial agencies.

Table 1

Local Authorities Committee	Provincial Agencies
• County of Stettler No. 6 • Lacombe County No. 14 • County of Wheatland No. 16 • Mountain View County No. 17 • County of Red Deer No. 23 • County of Newell No. 4 * • M.D. of Acadia No. 34 • Starland County No. 47 • Kneehill County No. 48 • Town of Sundre • City of Red Deer • Town of Drumheller • Special Area # 2 • Special Area #3 • Village of Empress	• Agriculture, Food and Rural Development - Public Lands Service • Community Development - Cultural Facilities and Historical Resources Division • Economic Development and Tourism - Forest Industry Development Branch - Small Business and Tourism Development • Energy - Mineral Resources • Energy and Utilities Board • Alberta Environment - Environmental Service - Land and Forest Service - Natural Resources Service • Municipal Affairs • Transportation and Utilities - Planning Branch
* the County of Newell joined the LAC in April of 1998	

1.4 Policy and Management Context

Existing government policy and legislation provides a framework for the plan. The management direction developed in this plan is consistent with this framework and in many cases elaborates on it in the form of specific resource management objectives and guidelines. As an example, the IMP reflects and reinforces the spirit and content of the provincial *Land Use Policies,* particularly with respect to the harmonization of provincial and municipal planning initiatives. A list of relevant legislation can be found in the *Technical Background Document.*

1.5 Organization of the Plan

The land and resource management direction in this IMP is divided into a number of sections for different resources or activities. In each section, the plan provides basic background information and outlines the resource management direction for each resource use and activity. The resource

activities are presented in alphabetical order and not on the basis of priority or importance. The direction for each resource includes management *objectives* which outline the goal or desired end result, and *guidelines* which provide direction for achieving the objectives. More specifically, guidelines provide direction for the management of resource and land use activities, offering integrated means for achieving the objectives.

The plan is divided into 4 sections: the first section provides an introductory overview of the corridor, the IMP process and its participants; the second section provides resource management direction for the whole corridor; the third section provides direction for each of the five individual reaches of the planning area and the fourth section is a technical appendix with background information to be used by land managers in support of land use decisions.

All components of the plan should be referred to when making management decisions. Direction in the corridor-wide section applies to all reaches and the reach-specific sections provide additional direction where deemed necessary. The reach-specific sections allow the management plan to account for local differences in natural and physical features, uses and needs along the corridor.

2.0 - CORRIDOR-WIDE RESOURCE MANAGEMENT DIRECTION

2.1 General Goal for IMP

The general goal or intent of the Red Deer River Corridor IMP is to guide and support sustainable development of the river valley. This means protecting the corridor's environmental and aesthetic integrity while ensuring the prosperity of local communities and Albertans as a whole. The corridor's natural resources and management issues are strongly interrelated through ecological relationships and the diverse human activities that affect them. Sustainable development includes both ecological and economic dimensions and the development of sustainable communities will be central to achieving this goal. *Maintaining the lifestyles of those who use the corridor is an important consideration in this plan.*

2.2 Resource or Issue-Specific Management Direction for the Corridor

The following management direction applies to the various resources or activities in the whole corridor. More specific management direction at the reach-specific level is provided later in the plan. *Objectives* outline the state, condition or quality of the resource or resource use that is desired. *Guidelines* state the direction or means by which resource management or use should occur to achieve the objectives.

The following resource categories are presented in alphabetical order and are not in order of priority or importance.

2.2.1 Aesthetics

During public consultation, the river valley's aesthetic qualities were identified as being important to both residents and visitors. Strong interest was expressed in ensuring that the scenic qualities of the valley are not diminished.

In many jurisdictions around the world, land use planning systems have been put in place to protect and maintain landscape aesthetics while accommodating the compatible use and development of land. This section presents a strategy for achieving this balanced goal of aesthetic protection and resource use.

The following section first outlines general concepts and terms used in the management and protection of landscape aesthetics. General objectives and guidelines are then provided for making land use and development decisions on public land. These guidelines can also be referenced by municipalities and developers if they choose to implement measures for protecting landscape aesthetics.

General Concepts and Terms:

Visual variety - This is a key landscape characteristic that creates the perception of scenic quality. It is the product of combined landscape elements such as landforms, vegetation patterns and water bodies.

Landscape Aesthetics and Tourism – it is important to note that tourism interests, preferences and trends are continually evolving. Current trends indicate a shift in interest from visiting heavily used tourist sites to experiencing landscapes that have fewer visitors and provide a more "authentic" experience. The management of landscape aesthetics should therefore not be limited to the traditional high use sites such as Drumheller and Dinosaur Provincial Park and should consider the whole valley as an important scenic/aesthetic resource.

Mitigation - This includes steps taken to ensure that a structure or development blends into the surrounding landscape. This can be done by using colours that complement the surroundings or by designing a building so its shape is less intrusive on the landscape.

Landscape Character - is used to define the typical or distinctive attributes of a landscape and/or its general appearance. For example, a landscape could be described as having an agricultural character which is created by the presence of typical features such as grain bins, fences and cultivated fields. In this landscape the placement of additional grain bins would be in keeping with the landscape character while the construction of a multi-lot residential subdivision would not.

The term landscape is used in this section simply to refer to the land, and features on it, that are visible from a given location. It contains no reference to the uses or other qualities of that land.

Objective:

1. To manage the use and development of land in the corridor planning area such that scenic qualities are retained.

Guidelines:

1. High profile and frequently visited sites will continue to be managed for the scenic values that make them important and popular tourist attractions. This includes landscapes visible from key viewpoints, tourism and scenic routes, recreation sites, parks and the river itself (for water-based recreation such as canoeing).

2. Consideration should be given to maintaining the existing landscape character in areas visible from highways where they cross the valley. Highway crossings provide the most frequent and accessible opportunities for viewing the river valley's scenery.

3. The maintenance of existing landscape character does not mean all development or land use is precluded. Structures can either be placed in locations where they are not visible or be designed to blend into the surrounding landscape. Many structures (such as grain bins and corrals in an agricultural landscape) are considered to be in keeping with the landscape character.

4. Areas of provincial, national or international significance, as identified by Environmentally Significant Areas reports, merit special consideration for aesthetic protection. Sites of this status are found in reaches four and five. The landscape diversity that is typically associated with ESAs (such as a wide variety of habitats) is very appealing to those who seek to explore rich and diverse natural landscapes.

5. Riverside trees and shrubs should be maintained (or enhanced where they would occur naturally) to provide screening of developments that would otherwise be visible from river level.

6. New structures that cannot be screened by vegetation should be set back sufficiently from the river's edge or from the top of the valley walls to minimize visibility from river level.

2.2.2 Access

In the Red Deer River Corridor, the basic transportation infrastructure is in place. There are enough river crossings to allow for easy movement of people and goods from one side of the river to the other. The crossings are bridges on primary and secondary highways with the exception of Bleriot and Finnegan Ferries. Landowners have in many cases created access on their own land, to the river and river flats, to satisfy agricultural or personal requirements.

Public access to other resources and the river itself is more complex. Highway access for vehicles is only a part of the need. Public access can be by foot, horse, or vehicle and can be for camping, hunting, walking, riding, bird watching, ATV use or other recreational purposes. This demand for public access is complicated by the patchwork of private and public leased land, topographical constraints, undeveloped road allowances and type of access required. This difficulty with access, land ownership and land use has resulted in problems of trespass and vandalism that will likely continue to present a challenge.

Management of access within the planning area is important for responsible stewardship of the land and resources. Economic stability of the farming and ranching community depends upon ongoing stewardship of the land. Control of access is important to the lessees in terms of protecting range conditions and limiting harassment to livestock. In addition, responsible use of leased land by the public can ensure that uses such as grazing, recreation and other uses can continue to co-exist.

Landholders recognize the need for access by industry, recreationists, the municipality and themselves. The Special Areas Board and Public Lands, in their capacities as public land managers, also recognize the position of lessees and will require all visitors or potential developers to acquire a leaseholder's consent for access prior to accessing any public land held under lease.

Objectives:

1. To maintain existing access points to the river for vehicular traffic.

2. To recognize the resource management concerns of leaseholders as stewards of public resources who have rights concerning public access, as consistent with current provincial legislation and policy.

3. To maintain the role of landowners and lessees as stewards and custodians of the land.

4. To ensure the agricultural community continues to pursue its livelihood in a sustainable and peaceful manner.

Guidelines:

1. The interdepartmental and agency referral process will continue with respect to location, design, construction and maintenance of transportation infrastructure.

2. Opportunities to increase access to the river valley should be discussed with all stakeholders involved (e.g., user groups, landowners, lessees, municipalities, Fish and Wildlife, etc.).

3. Access to land within the planning area will begin by contacting the affected landholder and lessee. The Special Areas Board and Public Lands agree that grazing lessee consent for access must be sought before anyone can enter onto public land under grazing lease.

2.2.3 Air Quality

In and near the Red Deer River Corridor, major industrial air emission point sources include several sour gas facilities, two chemical plants and a fertilizer plant. A power plant, located about 30 km Northeast of the corridor, is included in this synopsis because of the present relative magnitude of its emissions. Air pollutants emitted by these facilities include sulphur dioxide, hydrogen sulphide, oxides of nitrogen, ammonia, particulates, ethylene and other types of hydrocarbons.

There are also a number of significant emission sources in and near the corridor that are not licensed for air emissions. Vehicle exhaust emissions in and around Red Deer and Drumheller are likely a major air emission source in the corridor. Pollutants such as carbon monoxide, oxides of nitrogen, particulates and hydrocarbons are contained in vehicle exhaust. Other relatively minor emission sources include tanker trucks, brush burning, crop residue burning, refuse burning and road dust.

The Clean Air Strategic Alliance (CASA), a multi-stakeholder alliance, was established in 1994 to manage air quality issues and to develop a new air quality management system for Alberta. The Alliance will identify important air quality issues, prioritize problems, allocate and coordinate resources, develop action plans and evaluate results.

Under the provincial-wide CASA initiative, three regional airshed zones have been established to identify and address air quality issues from a local perspective. One of these zones, the Parkland Airshed Management Zone (PAMZ), encompasses the upper reaches of the Red Deer River Corridor study area (see map in Figure 2). PAMZ was incorporated in 1997 as a non-profit society to address air quality monitoring and management issues in the western parkland region. The organization's current focus is on developing a program to monitor and manage the region's air quality.

Objective:

1. To maintain good air quality standards in the corridor so the health and well being of inhabitants and ecosystems of the planning and adjacent areas are not jeopardized.

Guidelines:

To achieve this objective, air emission sources from industries which fall under EPEA jurisdiction will continue to conform to the following guidelines:

1. Industrial developments shall conform to EUB regulations in conjunction with clear air permits and other approvals under AEPEA and associated requirements of other jurisdictions.

2. Emissions from each industrial source will be controlled by using the best available demonstrated technology that is economically feasible.

3. Residual emissions will be dispersed through a stack designed to keep ambient concentrations below *Alberta Ambient Air Quality Guidelines* (refer to *Technical Background Document* for guideline details).

4. Industrial operators will monitor emissions and resulting air quality around their facilities and report measurements to Alberta Environment.

5. Cumulative emissions from all industrial sources, within a specified area, will be considered with respect to ambient objectives and regional air pollutant deposition.

6. Development of major air emission sources within the Red Deer River Valley will be discouraged because limited air pollution dispersion characteristics within the river valley may lead to higher air pollutant concentrations.

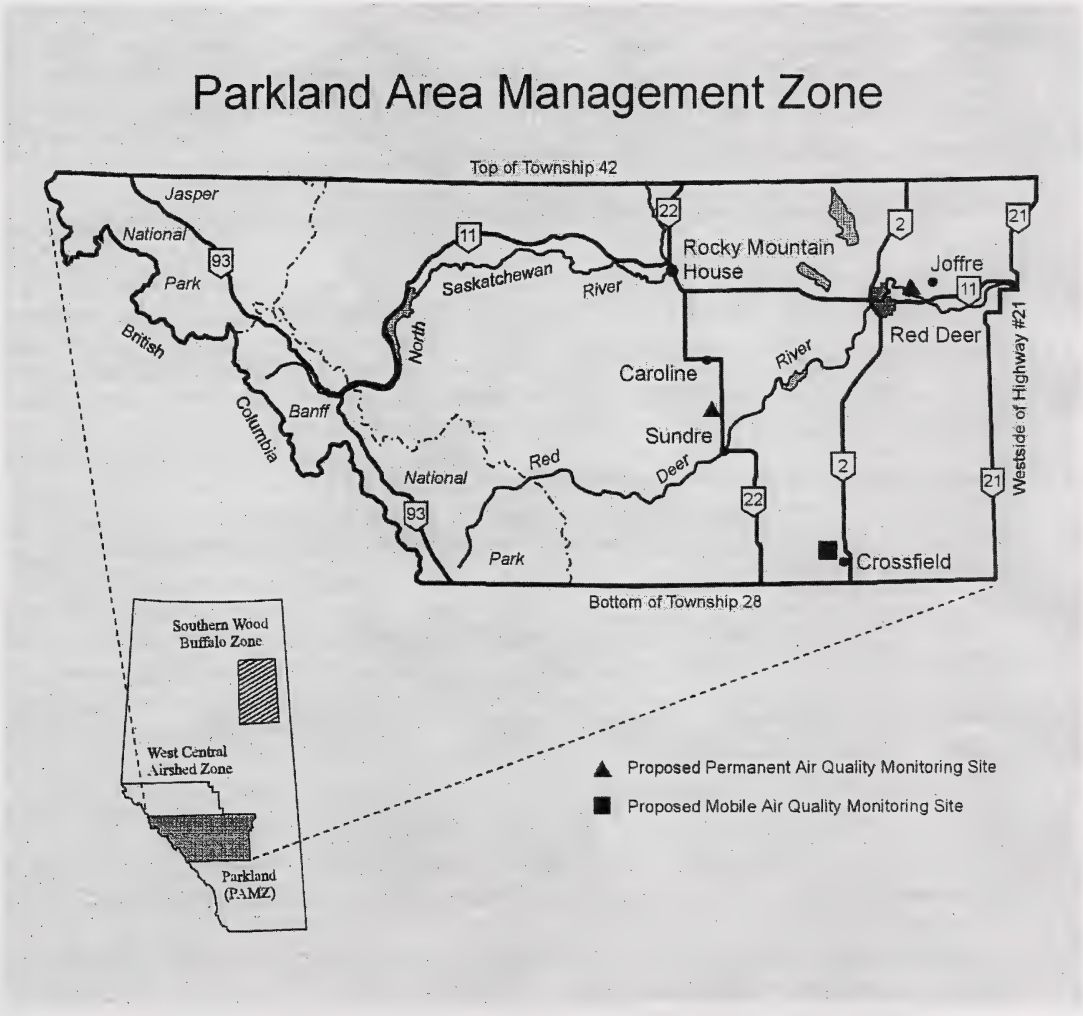
7. Stakeholders will be able to participate in air quality management strategies through Alberta's Clean Air Strategic Alliance. Within the Parkland Airshed Management Zone, stakeholders will have the opportunity to participate in a more locally focused air quality monitoring and management initiative.

8. Buffer zones between major air pollution sources and residential developments are recommended.

2.2.4 Agricultural Resources

The planning area has been used for agriculture since at least the turn of the century and currently supports a wide variety of agricultural activities including grazing, crop and forage production, livestock production and market gardens. Agricultural producers who live in and/or use the planning area make an important contribution to local economies and communities. The importance of agriculture to the local, provincial and national economies has been well documented over the years.

Figure 2 - Parkland Airshed Management Zone



There are 69 grazing leases and permits on public land, upstream of the Special Areas boundary, covering approximately 9,804 hectares. Collectively, these provide approximately 7,342 Animal Unit Months* (AUM) of grazing, most of which occurs on native range.

Agricultural activity on private land occurs throughout the planning area. The topography, climate and/or limited access dictates that much of the land in the river valley is used for grazing. Where conditions permit, production of forage and grain crops occurs. Irrigation for agricultural uses becomes more common downstream of Drumheller. Level upland areas adjacent to the river breaks are mainly used for grain production until climate becomes a limiting factor. This occurs downstream of Drumheller where grazing becomes more common on the upland areas.

Objectives:

1. To promote soil and water conservation practices on agricultural land.

2. To promote sound range management practices on rangelands.

3. To draw up a range management plan before undertaking any range improvement on public land.

4. To ensure agricultural activities are taken into account when land use decisions are made.

5. To maintain native plant communities on public rangeland and ensure its condition is "good" or better. This will ensure the maintenance of current carrying capacities and provide opportunities to increase them when management techniques make it feasible.

6. To modify existing wintering livestock practices (as required by the *Environmental Protection and Enhancement Act, Water Act* or Intensive Livestock Operation legislation/standards) where there are negative impacts on water quality and/or the immediate shoreline/riparian areas.

7. To ensure that new or existing Intensive Livestock Operations do not have a negative impact on water quality in the Red Deer River.

8. Permanent structures should not be located within the 1:100 year floodplain unless appropriate flood protection measures are taken that do not significantly interfere with the flow of water.

Guidelines:

1. Local Authorities and the Special Areas Board, in consultation with the Agricultural Service Board and landowners, will monitor agricultural practices to ensure soil erosion or range degradation does not occur. Public Lands will monitor agricultural dispositions to ensure soil erosion or range degradation does not occur.

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* An AUM is the amount of forage required by one Animal Unit for one month. An animal unit is the equivalent of one cow or one cow with calf.

2. The Special Areas Board and Public Lands shall maintain their policies of not increasing cultivated acres on cultivation dispositions and not converting grazing leases to cultivation dispositions.

3. The Special Areas Board and Public Lands shall maintain a professional Agrologist on staff to work with landholders. Their role will be to ensure that rangeland condition and its associated carrying capacity is not jeopardized by farm or ranching activities.

4. The Special Areas Board and Public Lands do not encourage the establishment of new commercial feedlots within the corridor planning area.

5. Alberta Agriculture, Food and Rural Development is currently developing legislation (Act and Regulations) and standards for Intensive Livestock Operations. The development and operation of Intensive Livestock Operations in the corridor planning area will be directed by any Act, Regulations or Standards established by the government.

2.2.5 Natural Heritage Resources

Throughout the planning area, the river valley environment changes considerably in terms of landform, vegetation and wildlife. The valley lies within three Natural Regions: Boreal Forest (Dry Mixedwood Subregion) in the west, Parkland (Central Parkland Subregion) in the central portion, and Grassland (Northern Fescue, Mixed Grass and Dry Mixed Grass Subregions) in the eastern section. The river valley supports a variety of special and unique landscapes, particularly through the Grassland Region where badlands and cottonwood forests provide landscapes and habitats vital to many plant and animal species.

The valley plays an ecological role that is far more important than its relatively small area would suggest. The valley's topography, with its variation in altitude, slope and aspect, creates a wide variety of environments blending Natural Regions and Subregions into a diverse mosaic. For example, areas of white spruce (typical of the Boreal Forest) can be found adjacent to patches of arid grassland habitat typical of the Dry Mixed Grassland. The uniqueness and variety of landforms, vegetation and wildlife in the corridor contributes to the quality of life enjoyed by residents and to the attractiveness of the valley as a tourism destination. Ecological characteristics of the corridor are discussed in more detail in parts of the plan dealing with specific reaches.

2.2.5.1 Environmentally Significant Areas

A series of Environmentally Significant Area reports have been prepared for all rural municipalities along the river corridor. Environmentally Significant Areas (ESAs) are identified and categorized as being of international, national, provincial or regional significance. These studies have been accepted for information only by the respective land managing agencies and municipalities and have not been translated into definitive management actions. Key points of the ESAs are discussed in this plan for each reach, however, it can be generally stated that the environmental significance of the valley increases from west to east. This is largely the result of the valley creating landscapes that are more structurally and functionally distinctive from the surrounding grasslands, thereby playing a more critical role as habitat.

The river valley in reaches one through three is described as being of regional significance. Most of reach four is described as being of provincial significance (from Content Bridge to Bleriot Ferry), with the balance being of regional significance. Reach five includes areas of international, national, provincial and regional significance. The one area of national significance includes river terrace cottonwood forests between Dune Point and Empress and the only internationally significant area is the valley and upland prairie in and around Dinosaur Provincial Park. Areas of provincial significance are: (1) Winter Hills uplands south of Drumheller (2) the river valley from Finnegan to Steveville, (3) the river valley from Dinosaur Provincial Park downstream to a point northeast of Jenner, (4) the mouth of Alkali Creek and downstream to, and including, Dune Point and, (5) the Dune Point Springs Area (south-facing slopes across the river from Dune Point).

There are a number of sites designated by provincial legislation or regulation as protected areas within the planning area. There are fifteen Natural Areas and three Provincial Parks. These sites play an important role in the management of environmentally significant areas. (There are also three small Provincial Recreation Areas but these make a very limited contribution to landscape protection.)

Objectives:

1. To manage ESAs of the Red Deer River Corridor in order to maintain the qualities for which they are recognized, with particular emphasis on areas of international, national and provincial significance.

2. To maintain the biodiversity and environmental integrity of unique landscape and habitat features found within the planning area.

Guidelines:

1. ESAs will be managed to maintain the ecological processes and natural features that give the areas their significance, while accommodating economic uses that can occur with minimal or beneficial effects on the areas. Well-managed livestock grazing will be an acceptable use of these areas. Good stewardship of natural landscapes by private landowners and grazing leaseholders on public land will be fostered and encouraged.

2. Greatest management emphasis, priority and attention will be given to the internationally and nationally significant areas, followed by provincially and regionally significant areas.

3. The management of ESAs will involve cooperation and consultation between local authorities and provincial agencies. The three levels of environmental significance could serve as the basis for common land management zones for both local authorities and provincial agencies.

4. On private land, provincial agencies are responsible for fish and wildlife, historical, water and mineral resources. As requested, provincial agencies will also assist local authorities with advice as to how best maintain the qualities of ESAs.

5. Local authorities are encouraged to incorporate ESA protection measures into their planning policies. In some cases this will require a cooperative initiative between local authorities when an ESA overlaps jurisdictions.

6. When requested by a municipality, provincial agency staff will provide assistance in developing policies and bylaws for the purpose of protecting ESAs. This will include application of the Natural Regions Framework (the basis for the Special Places program) to identify key areas and their natural attributes. Provincial staff will also provide advice, upon request, to local authorities as to potential impacts of proposed development on ESAs.

7. Depending on the significance of various areas, local authorities and provincial agencies could use a range of tools for their management. These could range from recognition and encouragement of good practices by landholders to land-use bylaws. The former could be more appropriate for areas of regional significance, the latter for areas of national significance.

8. Private land conservation initiatives can be facilitated through the application of Conservation Easements as defined in the *Environmental Protection and Enhancement Act,* Section 22.1.

9. In order to protect the ecological function and value of ESAs on public land, provincial land managing agencies may choose to develop management plans for specific sites. Any planning process untertaken will meet current government standards for public and stakeholder input.

10. Land managing agencies will coordinate reviews of possible environmental impacts of proposed developments or land use changes with a view to maintaining the qualities of ESAs on public lands.

2.2.5.2 Special Places

The Government of Alberta has adopted a policy known as Special Places, which is designed to complete a network of protected areas by the end of 1998. The principal goal is to preserve representative examples of the province's environmental diversity within a protected areas network. Other goals include the protection of special and unique features and the provision of Heritage Appreciation, Recreation and Tourism/Economic Development opportunities.

Special Places is a policy initiative directed at completing the province's existing system of protected areas. Any new protected areas designated through this process will be established by legislation. Special Places is a separate yet complementary initiative relative to the IMP as it advances the protection and management of public lands within the valley which are already recognized for their ecological sensitivity and importance. Detailed management plans will be prepared for any new protected areas, thereby building on the broad management priorities and guidelines already provided in the IMP. Municipalities have a similar option available to them if they choose to prepare management plans for any ESAs within their jurisdiction.

The scientific basis for this policy is the Natural Regions (subregions) and Natural History Themes land classification system (*Natural Regions, Report No. 1: A Framework for Alberta's Special Places).* The review process for proposed sites involves both provincial and local-level committees. Sites can be established through legislated designations such as Provincial Parks, Ecological Reserves, Natural Areas and Wilderness Areas.

While Special Places designations have not yet been established in the corridor, one provincially significant site is being considered for designation in the Tolman Badlands area.

2.2.5.3 Canadian Heritage Rivers System

The Canadian Heritage Rivers System was established in 1984 as a cooperative venture among the federal, provincial and territorial governments. Its primary purpose is to provide national and international recognition to our country's outstanding rivers and to ensure long-term management that will conserve their natural, cultural/historical and recreational values. The program is locally driven, hence decisions are made collaboratively, involving local stakeholders. The approval of municipalities, First Nations and the provincial government must be received at each major stage.

A Canadian Heritage River designation *has no legal standing* and is an honourary title that gives formal recognition to rivers that have nationally significant human or natural heritage and recreational values. The CHRS program provides the opportunity for local stakeholders to create a common vision for their river and their own plan to implement it. As part of the program, communities will benefit from national and international tourism promotions provided by the Canadian Heritage Rivers Board.

The Canadian Heritage Rivers program is implemented within existing legislation. Existing local authority responsibilities do not have to change for the program to be implemented and CHRS *nominations are only initiated at the local level with municipal authorities playing a key role.* While there is federal support for the program, any designated river (or portion thereof) will remain entirely within provincial/municipal jurisdiction. Strategies to implement the vision for a designated river would involve partnerships with stakeholders, local authorities and the province.

A three phase study was conducted to evaluate and identify which rivers in Alberta have potential for inclusion in the Heritage Rivers system. Seventy two rivers were evaluated in phase one and 39 were short listed for further evaluation in phases two and three. The phase three evaluation generated a list of rivers that were classed as either AA, A or B, with AA being the highest attainable rating. Ten rivers (or portions of) met the AA criteria.

Reach 1 of the Red Deer River received an "A" rating while reaches 2 through 5 received higher "AA" ratings. Therefore the Red Deer is a potential candidate Canadian Heritage River.

2.2.6 Fisheries

From a fisheries perspective, the Red Deer River changes dramatically throughout the planning area. Channel morphology, channel substrate, water temperature and water quality all change significantly and have a profound effect upon fish species presence, distribution and abundance. Human activities and developments have exacerbated many of these variables.

The Red Deer River above Glennifer Lake (Dickson Dam) can be characterized as a wild, cold water fishery which is not particularly productive. The most common species of native sport fish are mountain whitefish with incidental numbers of bull trout, walleye and pike; the latter two being primarily found seasonally from the reservoir up to the general area of the Raven River confluence. Introduced species in this section of the Red Deer River are brook trout, brown trout

and rainbow trout, however, none of these species are as common as the native mountain whitefish.

All species, other than mountain whitefish, are found primarily in tributary streams where habitat is more suitable. These tributary streams are Fallentimber Creek, Bearberry Creek, James River and the Raven River. However, Bearberry Creek has an impassable weir near Sundre which prevents any fish movement upstream. In addition, all tributary streams have been significantly impacted by both industrial (primarily pipeline crossings) and agricultural activities. Logging of both private and crown lands is a more recent habitat concern.

The Dickson Dam was completed in 1983, creating Glennifer Lake. Reservoirs on large rivers tend to have initial high productivity levels due to nutrients which leach from the freshly flooded basin. Glennifer Lake was no exception and it sustained a productive stocked rainbow trout fishery for about three years before initial productivity diminished. Rainbow trout have not been stocked in the reservoir since 1987. Walleye which have been stocked to augment the native walleye population have yet to produce a significant fishery.

The major limiting factor for any fish population in Glennifer Lake is annual water level fluctuations which prevent the formation of a productive littoral zone. This significantly reduces primary productivity and the availability of spawning and rearing habitat for warm-water species such as pike and walleye.

One of the most important stocked rainbow trout fisheries in Alberta was created during construction of the Dickson Dam. The Dickson Trout Pond is located immediately north of upper Glennifer Lake. This large pond is separated from Glennifer Lake by a wide berm. The ongoing existence of Dickson Trout Pond is totally dependent on the reservoir's annual peak full supply level being achieved in the fall. Since the trout pond is higher than Glennifer Lake for most of the year, pond seepage is only replenished when the lake rises sufficiently to spill water back into the pond. Water flows through a screened, gated underground culvert.

Since its construction, the Dickson Dam has had a major impact on fish habitat and fish populations in the reach immediately downstream of the dam. Numerous fisheries studies have been conducted on the Red Deer River from below the dam to Content (Nevis) bridge. These studies have also investigated fish populations in the lower Little Red Deer, Medicine and Blindman Rivers.

In this reach from Dickson Dam to Content bridge, native sportfish populations include mountain whitefish, walleye, pike, sauger, mooneye and goldeye. An introduced self-sustaining population of brown trout has also been established in this reach while rainbow trout introductions have failed to produce a viable population. This reach is the most productive and supports the most diverse fish populations anywhere in the Red Deer River. This is the result of many factors including the presence of Dickson Dam, changes from cold to warm water, nutrients and silt from major tributaries and sewage nutrients from the City of Red Deer.

The historic distribution of fish populations has been altered by the Dickson Dam. Not only did the dam block some traditional migrations but it also extended the cold water zone further downstream, enhancing habitat for mountain whitefish and brown trout. Conversely, the enhanced cold water fishery below the dam has moved pike, goldeye and mooneye populations further

downstream from their historic ranges. Between the Medicine River confluence and the City of Red Deer, the river gradually returns to its historic configuration.

Native walleye continue to occupy their historic range but the population has been heavily over-exploited. Strict conservation regulations are being implemented to address this issue although walleye recovery will be highly dependent upon successful spawning and rearing in the lower Medicine, Blindman and Little Red Deer Rivers. Water quality and habitat maintenance in these tributary watersheds will therefore be very important to any walleye recovery. The Medicine River, however, is the most significant walleye spawning ground and it has been impacted by agricultural activities including livestock operations.

Unfortunately, obtaining fisheries data below Content Bridge is much more difficult due to high turbidity levels (precluding fish observations) and difficult channel morphology. Normal fish population sampling techniques are often ineffective under these conditions. Consequently, there is a lack of good data on fish populations as one proceeds downstream from Content Bridge.

These lower reaches of the Red Deer River are clearly warm water fisheries as indicated by the absence of trout species. Native sport fish species in this reach typically include walleye, sauger, pike, goldeye and mooneye. Lake sturgeon are a significant species also known to occur between Drumheller and the Saskatchewan border. Lake whitefish are considered an incidental species and some mountain whitefish may still be present near Content Bridge. Little is known about these populations with regard to spawning and rearing areas, however, it is likely that spawning takes place in both the Red Deer River and its numerous tributary streams. Clean granular substrates in the lower reaches may provide important fish habitat, particularly for spawning. The predominantly sand/silt substrate downstream of Drumheller is greatly influenced by flood events creating highly variable habitat conditions.

The major policy for fisheries management in Alberta is the *Fish and Wildlife Policy for Alberta - October 14, 1982*, which is an approved cabinet policy of the Alberta government. It states that the primary consideration is to ensure that fisheries populations are protected from severe decline and that viable populations are maintained for future generations of Albertans.

The major legislative tool for fisheries management is the *Federal Fisheries Act of Canada.* This legislation has strong provisions to enforce the conservation of fisheries and to ensure that fish habitat is not harmed or altered by human activities. In addition, most sport fisheries regulations are enacted under the general umbrella of this Act. Negotiations are currently underway between the federal and provincial governments to arrange for the delegation of authority in the Act to the Alberta government.

One of the corner-stones of fisheries management policy is the principle of no-net-loss of fish habitat. This means that through a combination of protection, mitigation, enhancement and compensation, it is possible to maintain our productive self-sustaining fish populations.

Objectives:

1. To achieve the primary objective of the *Fish and Wildlife Policy for Alberta - October 14, 1982*, and ensure that fisheries populations are protected from severe decline.

2. To achieve no-net-loss of productive fish habitat within the basin.

3. To accommodate continued growth and economic development of other resources which are compatible with fisheries management objectives within the basin.

4. To take advantage of any mitigation or enhancement opportunities which may present themselves with any further developments.

5. To have sufficient and current fisheries population data to allow for proper management of fishery resources.

Guidelines:

1. Through normal inter-agency referral procedures, all proposed activities and developments which may affect fish habitat should continue to be reviewed by fisheries managers.

2. Instream Needs (IN) should be established for all species and life stages of those fish which are identified by fisheries managers.

3. No major diversion, either by a single diversion project or cumulatively by a series of lesser diversions, should be licensed without a proper IN assessment for fish.

4. The water quality of the Red Deer River and all significant tributaries should be maintained within provincial water quality guidelines.

5. The Red Deer River watershed should be protected from any activities or developments which would cumulatively result in harm or alteration to water yield, water quality or flood frequency.

6. The natural channel morphology and substrates should be maintained and protected from harmful siltation, channelization, bank protection, river crossings and gravel extraction.

7. New dams or weirs will require fish passage as directed by the Federal Fisheries Act. This will ensure the protection of traditional fish migrations to key habitat areas in the Red Deer River or any significant tributaries.

8. Current operations of the Dickson Dam should be maintained to ensure the viability of Dickson Trout Pond and to maintain improved downstream water quality and flows.

9. Fisheries managers need to continue to have the necessary resources for proper data collection and population assessments in order to properly manage fishery resources.

10. Public access to the river should be maintained for anglers.

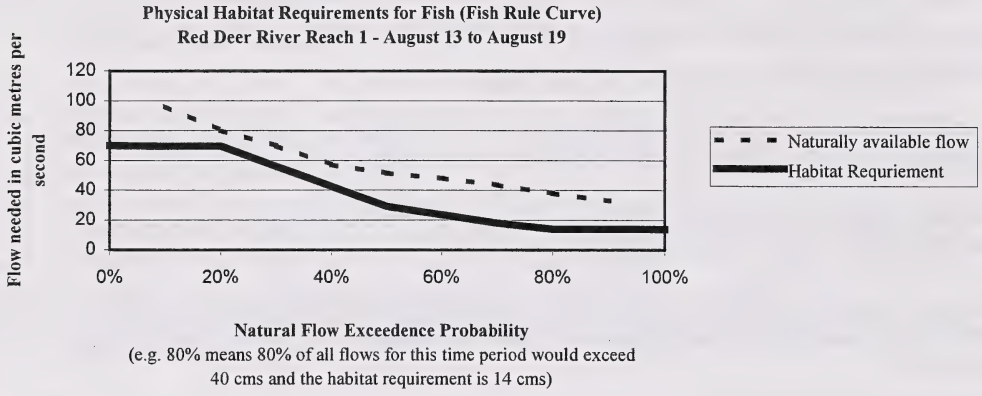
Instream Needs and the Fish Rule Curve:

Physical habitat requirements for fish in the Red Deer River are a component of the Instream Needs (IN). These physical requirements include the depth and speed of water flow, and bottom conditions, referred to as substrate. They represent the conditions necessary to provide habitat for the fish species present in the river. The requirements vary with time of year and the rate of flow

that would be naturally available in the river for the particular time of year. The naturally available flow is the flow that would have occurred in the river if there were no dams or water withdrawals.

Physical habitat requirements are often expressed in graphical form that shows what is called a "Fish Rule Curve" (see Figure 3). There are similar Fish Rule Curves for each reach of the Red Deer River below Dickson Dam and for each week of the year when water is typically open, early April to early November. The flow requirements for fish are a major part of the IN.

Figure 3



2.2.7 Forest Resources

Forest cover within the planning area varies considerably owing to variation in climate, landforms and soil parent materials. In addition, agriculture has modified much of the forest cover within the planning area, especially on upland sites. Native vegetation varies from stands of aspen, balsam poplar, lodgepole pine and white spruce (on upland sites west of Sundre) to short grass prairie in eastern portions of the planning area. Coulees, slopes, river terraces and flood plains are generally forested in the upper reaches. Further downstream, woody cover in the form of cottonwood trees is generally restricted to seepage areas and springs on coulees and slopes.

Forests in the planning area provide a variety of values including aesthetics, watershed protection, shade, wildlife habitat, recreational space and timber resources. Merchantable timber is located mainly within the valley breaks in the upper reaches of the planning area.

Public timber resources throughout the planning area are limited due to the small amount of public land and the previous conversion of forested lands to grazing. Conversely, timber resources are found on private lands, especially in upper reaches of the planning area. However, the full extent of these private timber resources is not known.

Since 1993, logging activity on private lands has created considerable interest among landowners. Market prices for both lumber and pulp have created a significant demand for timber although the total area of private lands harvested is unknown. During a 1995 aerial reconnaissance west of Red Deer, recent logging was observed on nine separate quarter-sections of private land between the IRP boundary and the Highway 54 bridge. A significant area of private-land timber remains along this river reach.

Logging on private lands has created concerns which were voiced during the 1994 IRM public information meetings. Deforestation, clearing to the riverbank, maintaining the natural landscape, protecting trees and vegetation for fisheries, and flood and erosion control were among the stated concerns. Management of timber resources on private lands is the responsibility of the landowner, however, they must follow a regulatory process for the transport of coniferous logs harvested.

Valuable timber resources may be lost from time to time due to natural causes such as wildfire. Development in forested areas may increase the risk and severity of wildfire. The Land and Forest Service has a program for dealing with wildfires within the Forest Protection Area to protect human life, property and valuable timber resources. The upper reach of the planning area, where timber resources are concentrated, lies within this Forest Protection Area.

Timber resources may also be lost to tree diseases such as dwarf mistletoe which affects pine trees. Dwarf mistletoe may be present in the planning area. Monitoring is generally carried out in forested areas to determine the presence of diseases.

Riparian Vegetation Management:

Coulees, slopes, river terraces and flood plains are generally forested in reaches 1, 2 and 3. In reach 4, forested land starts to become restricted to the flood plains and protected east and north facing slopes. Much of the vegetation on the valley floor is a distinctive community known as riparian vegetation, consisting of trees, shrubs and grasses and forbs. This riparian area can be defined as land adjacent to the normal high water line of a river, and extending to all the land that is influenced by the presence of adjacent ponded or channelled water (World Wildlife Fund and Alberta Forestry, Lands and Wildlife, 1992).

A significant vegetation transition occurs in the lower end of reach 4. Between Tolman Bridge and Bleriot Ferry, there is a transition zone between balsam poplar (the predominant riparian poplar species upstream), and plains cottonwood (the riparian poplar species found downstream). In reach 5, the cottonwood forest is a distinct and unique community in the grasslands landscape. Many wildlife species are fully dependent upon this community for habitat because it is structurally and functionally different from the surrounding grassland. The cottonwood forests have an ecological importance that is greatly disproportionate to the relatively small area they occupy in the grasslands. These riparian cottonwood communities are found on both public and private land.

The plains cottonwood is not a commercial timber species, but provides many benefits nonetheless. Among these are: wildlife habitat, aesthetics, shelter for livestock, water quality protection and recreation.

Plains cottonwood are vulnerable to human activities, and in other areas of Alberta and North America, cottonwood forests have been damaged or seriously depleted. This damage can occur as

the result of land-use and/or water management practices. Detrimental land-use activities include clearing, development and some agricultural practices. Water management practices can have a negative effect by changing flow regimes below dams and diversions. Flow regimes can affect the recruitment and survival of cottonwood seedlings and the sustenance of established trees (see "Instream Needs and Riparian Forests" on page 41). The management of cottonwood forests is one area where integration between land and water management is essential. That is, there would be no point in managing water for the purpose of sustaining cottonwoods if a land-use practice is in place that is at cross-purposes.

The cottonwood forests along the Red Deer River have not been reported to be under a particular threat at this time. However, experience in other areas, including Alberta, suggests the forests can be easily damaged.

In response to the negative effects that have been observed in some cottonwood forests in Alberta, the Department of Forestry, Lands & Wildlife (since replaced by Alberta Environment) and World Wildlife Fund Canada studied and prepared a Conservation and Management Strategy for Riparian Forests in Southern Alberta, (1992). The strategy was prepared as a follow-up to the Prairie Conservation Action Plan, which makes the protection of cottonwood forests a high priority. As this is a policy of Alberta Environment, the conservation and maintenance of riparian forests will be considered in the water and land management planning in which the department is involved. However, the municipalities, Special Areas Board and the Department of Agriculture, Food and Rural Development are not signatories of the policy.

Objectives:

1. To maintain opportunities for managing forest resources on public land on a sustainable basis, or, where appropriate, for the conversion of forests to rangeland under approved range improvement programs.

2. To minimize the occurrence and severity of wildfires on forested public land.

3. To monitor and control insect pests and diseases on public land where required to maintain healthy timber resources and minimize losses and damage.

4. To promote sustainable forestry practices on private lands.

5. To protect land and resources along water courses on private land to maintain water quality and protect fish habitat.

6. To encourage landowners to protect or enhance wildlife habitat during forestry operations on private land.

7. To maintain healthy, sustainable cottonwood forests where they would naturally occur.

8. To follow the Conservation and Management Strategy for Riparian Forests in Southern Alberta

9. To increase knowledge of the ecology and management needs of riparian forests in the Red Deer River valley.

Guidelines:

1. Harvesting and disposal of any merchantable timber on public land will follow existing regulatory processes. At a minimum, *The Alberta Timber Harvest Planning and Operating Ground Rules* will apply to public land forestry operations.

2. Development standards for new subdivisions in forested areas on public land should be reviewed towards reducing the fire hazard created by new development and to ensure concerns for fire suppression activities are addressed.

3. Emergency response agencies will work together to coordinate fire suppression efforts in developed forested areas on public land.

4. Insect and disease conditions on forested public land will be monitored and controlled within existing programs.

5. The following guidelines will be available to private landowners for carrying out sustainable forestry operations on their land:

    - forest management planning prior to forest harvest operations will be carried out,
    - harvesting on slopes greater than 45 degrees will be avoided,
    - "light" harvest operations will be used on steep slopes and sensitive soils (e.g. smaller equipment and horse logging),
    - partial harvest systems will be used
    - harvest operations will be restricted to frozen ground on wet soils or where potential for erosion is high,
    - buffers of an adequate width for watershed and fisheries protection should be left along water courses,
    - seed trees will be retained where possible as a means of encouraging natural regeneration,
    - reforestation projects will be done immediately after harvesting,
    - fire prevention equipment will be available during forestry operations,
    - debris from harvest operations will be adequately disposed of,
    - to refrain from timber harvesting during wildlife calving months,
    - educational information through the Alberta Private Woodlot Program (1-800-619-5732) or other sources on sustainable forest management practices will be encouraged, and

- communication between neighbours concerning pending logging activities will be encouraged.

6. Landowners who plan on having their coniferous timber hauled on a public highway from their land must purchase a permit for each load of timber to be hauled.

7. Further research on riparian forests will be conducted and funded by Alberta Environment and other agencies.

8. Land use practices will be designed to sustain and, if necessary, restore riparian forests.

9. In reaches that are affected by the management of dams, diversions and major withdrawals, flow regimes will be used to support the recruitment, establishment and sustenance of riparian forests.

2.2.8 Historical Resources

Historical resources are divided into four classifications of resources: archaeological, palaeontological, quaternary (Ice Age) palaeontological and historic period resources

Archaeological Resources:

The Red Deer River, like most rivers in southern Alberta, was particularly important to aboriginal survival in prehistoric times. Native peoples required wood resources of the valley for their semi-permanent wintering villages. The pedestrian hunters of the last 11,000 years similarly required access to river water during the summers. Archaeological research has demonstrated that the highest archaeological site densities occur within and up to 1 1/2 miles from the valley escarpments. Valley bottom sites, rapidly buried by flood water deposits, constitute some of the most significant historical resources known due to the exceptional preservation of organic materials. Valley margin sites include the more common domestic tipi-ring sites as well as rare stone feature sites of a ceremonial nature (e.g. medicine wheels, effigies, etc).

Relatively little archaeological survey work has occurred along the Red Deer River. The most intensive inventory was conducted from the Saskatchewan border to the mouth of Blood Indian Creek, with particular attention paid to the Alkali Creek area. Although this survey recorded hundreds of archaeological sites, no systematic sub-surface exploration was conducted. Occasional work elsewhere in the valley has demonstrated the presence of terrace campsites of great value and integrity and such sites are certainly more widely distributed than current numbers suggest. To date, over 1,400 archaeological sites have been recorded along the river. Of these, 26 sites are of such extraordinary significance that they should be preserved in perpetuity. Undoubtedly, other sites of similar significance remain to be discovered.

Palaeontological Resources:

The Red Deer River and its major tributaries run through some of Alberta's most sensitive palaeontological areas. In general, significant palaeontological resources may be present anywhere in the corridor where bedrock exposures are present.

A synopsis of palaeontological resources is provided in each reach-specific section. It is divided into a number of regions based on the age of the rock and the nature of the palaeontological resources encountered.

Quaternary Palaeontological Resources:

The Provincial Museum of Alberta supports a curatorial program devoted specifically to the collection and study of Quaternary (Ice Age) palaeontological resources. The majority of known Quaternary resources within the planning area are located in Reaches 1, 4, and 5, however, Quaternary fossils can be found virtually anywhere within the planning area.

Historic Period Resources:

The types of sites listed in the Historic Sites Service Inventory are a good indication of the historic period resources one would expect to find in the planning area. Generally speaking, these sites reflect the historical evolution of the area and include many ranching and settlement sites, coal mines and many urban buildings. It is probable that transportation related historic period sites such as rail lines, ferries, historic trails etc. also exist in the planning area, as well as sites associated with early lumbering on the Upper Red Deer River.

Overall, the planning area is rich in both pre and post-contact sites. As a result, there is a high probability that any specific corridor development would impact historical resources and the probability increases with the scale of a project.

Objectives:

1. To identify and protect significant historical resources in the planning area.

2. To ensure that future resource development involving land surface disturbance is undertaken in a manner that preserves, minimizes impacts to, or results in the recovery of historical resources.

3. To manage significant historical resource sites for scientific, interpretive and educational purposes.

4. To promote independent studies and efforts directed towards the identification and interpretation of significant historical resources.

Guidelines:

Based on the nature of historical resources, both general and specific guidelines have been established.

General:

1. Resource uses in the planning area that result in land surface disturbance may require an Historical Resources Impact Assessment prior to development proceeding (the requirement for an assessment is determined by the Department of Community Development). These

assessments, and any additional work which may result from these assessments, will be conducted at the expense of the development proponent.

2. Historical Resource Sites which have been identified as being provincially significant may be considered for designation under the *Historical Resources Act.* These sites should be avoided and left undisturbed.

3. On areas containing or adjacent to a significant site, Alberta Community Development will be referred all land use dispositions for review. Depending on the type of project being proposed, and the sensitivity of the particular significant site involved, one of the following requirements will apply:

   a) Surface access is not permitted.

   b) Surface access is subject to specific conditions (i.e., an Historical Resources Impact Assessment will be required prior to conducting any surface disturbance).

   c) Surface access has yet to be determined. In this instance it must be demonstrated that the proposed development will not disturb the site.

   The integrity of these resources is not to be affected by any development activity.

4. Development referrals should be sent to the Community Heritage Services Section of the Historic Sites Service for review.

Archaeological Resources Guidelines:

1. Historical Resource Impact Assessments may be required on projects involving land surface disturbance of one hectare in size or greater (e.g., oil/gas well-sites, multi-lot residential/recreational subdivisions, industrial subdivisions, gravel pits, pipelines, highways, etc.) in areas which have been identified as having "high archaeological potential" on the Eastern Irrigation District (EID) archaeological resource sensitivity map.

2. Historical Resource Impact Assessments may be required on projects involving large scale land surface disturbance (e.g., coal related developments, range improvements, new irrigation/water supply projects, pipelines, highways, etc.) in areas that have been identified as having "low archaeological potential" on the EID archaeological resource sensitivity map.

   Land located within the river valley which include the terraces and river bottoms have demonstrated potential to contain buried archaeological sites. Organic preservation, rapid sealing of occupation floors and high site integrity make such sites of great scientific significance. Rapid deposition often results in the separation of camping episodes and allow archaeologists to study culture change on very small time scales. For this reason in-valley sites are often difficult to discover and when found are considered to be of very high significance. Given the demonstrated high archaeological potential of the Planning area, Alberta Community Development would request referral of the following types of proposed development projects:

Subdivisions:

(1) Referral of only multi-lot country residential and residential subdivisions involving an area of 10 hectares or larger, or large single or multiple parcel commercial/industrial subdivision proposals.

(2) Referral of all proposed developments within 0.5 km of a designated or significant historical resource. With this exception, Community Development is not interested in single parcel/first parcel out applications, applications for farmstead separation or related agricultural activities, or country residential/residential subdivision applications of less than ten hectares in size.

Transportation:

Referral of any proposed transportation projects involving new rights-of-way/borrow sources.

Tourism/Recreation:

Referral of any proposed Tourism/Recreation Developments involving significant amounts of surface disturbance (10 hectares or larger).

General:

Referral of any type of development located within .5 kilometer of a designated or significant site.

Historic Period Resources Guideline:

Any historic period resources (e.g., structures, dams, canals, bridges, fortifications, trails, etc.) encountered in the planning area should be reported to staff of the Historic Sites and Archives Service.

Quaternary Palaeontological Resources Guidelines:

Should any bones be encountered during the course of construction activity in the planning area, staff of the Resource Management Section of the Historic Sites and Archives Service should be contacted immediately. Any bone encountered during development in the planning area should be reported to staff of the Provincial Museum of Alberta or the Royal Tyrrell Museum of Palaeontology rather than being dismissed as the remains of recent domestic stock.

2.2.9 Mineral Resources/Industrial Development

Mineral resources and industrial development have played a key role in the settlement and development of the region. Oil and gas exploration, development and production throughout the area continues to provide major economic benefits for residents and for the province as a whole, including stabilizing the agriculture sector by means of entry payments and annual land rentals for industry infrastructure.

Mineral resources found along the valley of the Red Deer River include coal, oil and natural gas. About 95% of the river's length runs through oil and gas fields, mostly natural gas to the east of the City of Red Deer and mixed oil and gas to the west. The planning area includes portions of 31

gas fields, 5 oil fields and 1 oil and gas field. Eighteen gas processing plants are located within the area, ranging in size from 17 m^3/day capacity to over 3,000,000 m^3/day. Four of the plants handle sour gas, two of which produce elemental sulphur. Most of the gas plants are set well back from the river and from tributary creeks. Numerous natural gas wells are located in the planning area. Some stretches of the river valley contain many wells while others have few, depending on reservoir productivity, topography and access.

Coal fields underlie all of that portion of the planning area from the City of Red Deer to twenty kilometers southeast of Drumheller. This coal bearing stretch of the river includes 23 coal deposits of the Alix, Ardley, Drumheller and Scollard coal fields. There are no operating mines in the planning area but there are extensive areas of surface mineable coal in the 30 kilometer stretch of the river valley from Ardley to Nevis, with only a few other areas identified as surface mineable scattered as far downstream as Ghost Pine Creek.

Crown minerals in the planning area are disposed of by various mineral agreements. Crown oil and natural gas is virtually all leased for exploration and production. Extensive areas of crown coal are under lease in the stretch of river where there are areas of surface mineable coal from Ardley to south of Dry Island Buffalo Jump Provincial Park. Metallic and industrial mineral exploration permits, spurred by speculation about diamonds, cover most of the planning area. Privately owned mineral rights (freehold minerals), which are found throughout the planning area, are respected by this plan as having all the rights of private property. The minerals on the south side of the river from Dinosaur Provincial Park to Drumheller are virtually all privately owned. As well, most of the planning area upstream of Dry Island Buffalo Jump Provincial Park is underlain by freehold minerals. The remaining portions of the planning area are dominantly crown owned minerals.

The Terms of Reference limits the planning for minerals to where extensive tracts of crown minerals occur. This is to be broad minerals direction only, except in the eastern end of the planning area where there are large extents of provincially owned mineral resources in combination with crown land.

Objectives:

1. To provide opportunities for industry to explore and develop mineral resources where proven reserves or productive formations exist.

2. To encourage the orderly exploration of minerals in previously unexplored areas and formations.

3. To promote the recovery of mineral resources in a manner that optimizes supply and economic benefits, and addresses environmental concerns.

4. To allow for the exploration and development of oil and natural gas while minimizing land disturbances and promoting environmental protection.

5. To provide opportunities for further exploration and potential development of coal resources.

6. To provide opportunities for exploration and development of quarriable, metallic and industrial minerals.

7. To encourage oil and gas and utility companies to use existing right of ways for river crossings.

Guidelines:

1. Mineral resource exploration and development will follow the existing regulatory approval processes.

2. Mineral exploration and development activities will minimize impacts on watershed, wildlife habitat, recreation, aesthetics and other resources.

3. To ensure native grass prairie is maintained, special oil and gas operating conditions in native prairie areas will be applied in accordance with the *Guidelines for Minimizing Disturbance on Native Prairie Areas* (1996, EUB Information Letter 96-9).

4. New well sites or minerals facilities may be subject to the following conditions along the Red Deer River:

   - developments to be set back from recreational areas at least 100m;
   - development of new access to river's edge to be avoided,
   - public access on well site roads to be controlled or prohibited for reasons of environmental protection and safety;
   - setback from river breaks in accordance with Public Lands policy.
   - permanent structures should not be located within the 1:100 year floodplain unless appropriate flood protection measures are taken that do not significantly interfere with the flow of water.

5. On public land, development will not be allowed below the river breaks where there is no existing access.

6. Mineral access may be subject to development of multi-well pads and/or directional drilling into sensitive or wetland areas.

7. Site development shall employ visual mitigation techniques to maintain the aesthetic quality of the immediate area.

2.2.10 Recreation and Tourism Resources

A variety of regional, provincial, and internationally significant recreation resources, attractions, activities and accommodations are located in or adjacent to the planning area.

Recreationists come from local communities, major urban centres and out of country locations. Many recreational activities are river-based, although each reach has a different combination of

activities. These activities include canoeing, rafting, kayaking, tubing, power boating, fishing and swimming. Others such as hiking, wildlife viewing, horse riding, mountain biking and cross-country skiing occur nearby. Some recreationists use the services of commercial tour operators or outfitters and there is the opportunity for more guided services. Several parks in the planning area include day use areas with recreational trails, facilities for picnicking, interpretive programs and other facilities of interest. There are also facilities in the planning area for more physically active recreation such as downhill skiing and golf.

Much of the attraction of the Red Deer River for recreation and tourism activities can be attributed to the scenic qualities and natural and cultural resources of the river valley. These resources provide opportunities to view diverse plant communities and a variety of wildlife. Some stretches of the river, particularly downstream of the City of Red Deer, are noted for their unusual landscapes and geological features as well as palaeontological sites. The planning area also contains an abundance of archaeological and historic sites, both native and non-native. Many of the natural and cultural attractions are interpreted at protected areas like Dinosaur Provincial Park, or at museums like the Royal Tyrrell Museum of Palaeontology. The planning area has significant ecotourism potential, especially in reaches 1, 4 and 5.

Many types of accommodation are already located in or near the planning area such as hotels, motels, bed and breakfasts, guest ranches and campgrounds. A large proportion of this accommodation, however, is concentrated in the urban centres of Red Deer, Drumheller and Sundre. There are also stretches of the river where formal camping opportunities are quite scarce.

Several studies conducted for adjacent regions (Community Tourism Action Plans) have identified tourism assets and opportunities. It is clear that maintaining the natural quality of the river valley, while providing opportunities for recreation and commercial tourism, is a priority for the Red Deer Corridor and the communities which are adjacent to it.

Tourism activities, attractions and accommodations are located on both public and private land within the planning area. It is important that there be sufficient public land and access to the river corridor, as well as river-based access to the shorelands, to meet growing needs.

Objectives:

1. To maintain and, where possible, increase opportunities for outdoor recreation in the region, particularly relating to river valley's wildlife, historical, archaeological, palaeontological and scenic resources. These resources are to be protected in a manner that does not impair their values for tourism and recreation.

2. To encourage tourism development to focus on activities and services that are compatible with the corridor's natural and cultural heritage values. The ecotourism model (low impact and environmentally/culturally sensitive tourism) provides a good example of tourism services that can contribute to local economies while respecting cultural values and the natural environment.

3. To recognize the important role the Red Deer River Corridor plays in linking water-based recreation and tourism opportunities.

4. To manage recreation and tourism resources so as to minimize any negative impacts of use, and to sustain the natural values and aesthetic qualities of the environment, while allowing public enjoyment of the resource.

5. To minimize conflicts between recreationists, especially motorized and non-motorized user groups.

6. To enable public access to recreation resources and associated trails and trailheads.

7. To increase viewing and interpretation opportunities for enjoyment of wildlife resources.

8. To encourage the establishment of scenic spots/lookouts throughout the corridor for hikers, walkers, picnickers, and others at both walk-in and road accessible locations.

9. To ensure, when possible, that instream flows are of sufficient quantity and appropriate timing such that water-based recreation activities (which would occur in the absence of any water control or withdrawal projects) can be enjoyed on all reaches of the river. (Note, however, that recreation demands will not drive the instream needs - see instream needs section on page 41).

Guidelines:

The tourism guidelines which follow are based on the notion of Stewardship. Everyone has a role in river and land stewardship which is better when coordinated, pro-active and oriented to minimizing the cumulative impacts of development on the watershed.

1. General access to the planning area should occur freely along developed road allowances, formally designated river access sites or as a result of partnerships developed with the occupant of the land. Undeveloped road allowances should remain available for access to and from the river valley.

2. Residents along the river valley should be recognized as key stewards of the resources and should have an integral role in issues affecting the land and water.

3. Proposals for commercial recreation and tourism development on public land will be reviewed through the Alberta Tourism and Recreation Leasing (ATRL) process which obtains input from local municipalities and others. The ATRL is administered by Alberta Environment. Local authorities have the final authorization of proposals through their development permitting process.

4. Environmental impacts from recreation and tourism developments will be minimized through appropriate conditions on public land dispositions. Development of recreational and tourist facilities and services by the provincial government may occur in response to an identified demand and within available budgets.

5. Consultation and advice will be provided by Alberta Economic Development and Tourism and other government agencies to existing and potential operators of commercial tourism facilities and services. Advice will also be available to local communities and organizations

interested in expanding the region's tourism industry. Where available, market and demand information will also be supplied.

6. Off-highway vehicle use should not be permitted in steep/unstable areas or in key wildlife habitat areas (these are identified on a series of maps that have been made available to local authorities).

7. Development of "river access only" campsites along the shores shall involve consultation with key affected stakeholders such as the local municipality, Special Areas Board (SAB), landholder.

8. Campsite location and development shall consider impact to sensitive landscapes and habitat as identified within the ESA study of the Lower Red Deer River.

9. The SAB, as the public land manager in the Lower Red Deer, shall not offer new surface dispositions (leases or permits) on the islands. Islands may offer camping opportunities to the casual traveler, provided that campers continue to exercise due care and attention to the sensitive vegetation and prevalent fire hazards.

10. The SAB, in consultation with the landholder and other key affected stakeholders, shall entertain proposals for development of formal access and/or campsites. Local stewardship will be encouraged to maintain aesthetic qualities of the site and adjacent lands.

2.2.11 Multi-Lot Residential Development

Residential subdivision development is under municipal jurisdiction and does not occur on public land. The information, objective and guidelines in this section are therefore offered as a reference for municipalities in the corridor. Some common subdivision issues are presented and guidelines are offered for local authority consideration. The intent of this section is to encourage, where possible, consistency in the approach to residential development throughout the corridor. It is, however, recognized that local needs and interests vary and that municipalities will make development decisions based on site and situation-specific information. Provincial involvement typically occurs through referral processes that address impacts on resources under provincial jurisdiction (e.g. historical resources, wildlife, water etc.).

Multi-lot subdivision of land for residential purposes in rural areas is an issue throughout the corridor, and in fact, throughout the province. While some areas in the study area may have a higher degree of pressure for this type of development than others, the same fundamental issues are involved. Concerns which may arise from residential subdivisions include:

1. Loss of agricultural land to residential use

2. Potential conflicts between existing agricultural practices and newer "urban-style" developments

3. Increased potential for pollution due to near-river developments

4. Instability of valley slopes as a result of (or having an effect on) subdivision and/or construction activities

5. Potential for flooding and/or serious erosion of subdivided properties

6. Adequacy of local water supplies to accommodate increased demands

7. Increased access to and use of river resources

8. Loss of wildlife habitat and interruption of wildlife travel corridors

9. Fire hazards in areas of continuous forest

A related issue in the area of land subdivision and development is intensive livestock operations. A proposal for an intensive livestock operation, whether at the subdivision or development permit stage, frequently generates opposition and concerns relating to:

1. Potential for pollution

2. Potential conflicts with existing land uses in the area (often residential),

3. Adequacy of local water supplies,

4. Nuisance ("quality of life") conditions such as noise, odours, traffic, etc.

Objective:

Subdivision development should be managed to ensure that an appropriate review of social, environmental and economic issues is undertaken prior to approval.

Guidelines:

Subdivision approving authorities within the corridor should adopt consistent, defensible criteria to guide their planning process and to allow reasonable conditions to be imposed on proposed subdivisions. To assist in the generation of appropriate subdivision criteria, the following are some suggested general guidelines for the corridor:

1. Subdivisions should not be located within 30 metres (100 feet) of the valley breaks.

2. Subdivisions should not be allowed in those lands identified as slump prone (prone to slipping due to unstable soil conditions) (these areas are identified on a series of maps that have been made available to local authorities).

3. If allowed in the valley bottom, subdivisions should establish a minimum setback from the river's edge to allow for wildlife movement. Environmental reserves around subdivisions should be considered as the appropriate tool for protecting wildlife travel corridors (see corridor-wide guidelines for wildlife resources on page 47). Exact setback distances should be determined through consultation with wildlife experts and tailored to site-specific circumstances.

4. Permanent structures should not be located within the 1:100 year floodplain unless appropriate flood protection measures are taken that do not significantly interfere with the flow of water.

5. Residential development on prime agricultural land should be avoided where possible (Class 1, 2 and 3).

The province has also published several guideline documents for residential subdivision development. These publications are **not** regulations and thus have no enforceability unless adopted by a local authority. The guidelines can be used by the local authority to assist in the generation of appropriate subdivision criteria. A list of these publications is provided in the *Technical Background Document.*

2.2.12 Surface Materials

Sand and gravel deposits are found throughout the planning area. Deposits are not evenly distributed along the length of the river in volume or ease of access. The major use of gravel is for road construction and maintenance.

On private land, sand and gravel extraction is regulated by the Alberta Environmental Protection and Enhancement Act and its regulations[1]. Any pit above five hectares in size requires an AEPEA approval. All pits must be registered and reclaimed back to equivalent land capability. Many of the municipalities require development permits under the *Municipal Planning Act.*

On public land the activity is regulated by the Public Lands Act. All pits require an approval under the Public Lands Act. All activities within the bed and shore of the river or any permanent water body will involve public land.

If the activity affects water, approval under the Water Act will be needed.

If the activity affects fish habitat or navigable waters, Federal authorization will be needed.

Objective:

1. To maintain opportunities for obtaining sand or gravel from the planning area, subject to prevailing conservation and reclamation regulations and other resource concerns (note, Alberta Environment is currently reviewing its policy for sand and gravel mining within floodplains.)

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[1] Division 2 - Approvals and Certificates, and Part 5 - Conservation and Reclamation of AEPEA. Regulations include all conservation and Reclamation regulations, section 5(1) of the Activities Designation regulation, and the Approvals Procedure Regulation.

Guidelines:

1. Applications for sand and gravel extraction in the active flood plain will be reviewed through the existing provincial government referral system.

2. Sand and gravel extraction from islands or river channel bars will not normally be approved.

3. Removal of riverbed gravel or sand will not be approved.

2.2.13 Transportation Infrastructure

The Red Deer River is intersected by a number of primary highways and secondary highways. These include Hwy 2, Hwy 9, Hwy 11, Hwy 21, Hwy 22, Hwy 27, Hwy 36, Hwy 41, Hwy 56, SH 570, SH 575, SH 585, SH 587, SH 590, SH 592, SH 837/838, SH 848, SH 858, SH 876, SH 884 and SH 886. The planning, construction and maintenance of primary highways is under the jurisdiction of Alberta Transportation and Utilities. Secondary highways and local roads are under the direction and control of local authorities with the cost of construction for secondary highways being shared with the province.

Objectives:

1. To continue to provide an efficient and safe transportation system, including a primary highway system, for the movement of goods and people, now and in the future.

2. To ensure all historical, archaeological, cultural and natural resources are considered before any new road construction is undertaken.

3. To ensure when development occurs, due consideration is given to provincial primary highway planning. Specific information should be obtained from Alberta Transportation and Utilities, Planning Branch.

4. To minimize adverse effects of infrastructure development on the environment, while promoting growth and prosperity in the region.

5. To maintain reasonable access to the planning area for residential, industrial, recreational, scientific research and municipal needs.

6. To maintain the existing landscape characteristics that provide habitat features critical to wildlife, livestock and the riparian community.

Guidelines:

1. The interdepartmental and agency referral process will continue with respect to location, design, construction and maintenance of transportation infrastructure.

2. Due to considerations of wildlife habitat, aesthetics, erosion and tourism, any new road development along the corridor should be located outside the valley, above the breaks.

3. Access to the planning area through road development shall occur in consultation with the affected landholders and other key stakeholders.

4. Road development/placement should occur in a manner that does not jeopardize the integrity of landscape features within the planning area. Roads should be placed to conform to the natural topography of the landscape to the greatest extent possible.

2.2.14 Water Resources

The Red Deer River is one of the three sub-basins, along with the Bow and Oldman, which make up the South Saskatchewan River Basin (SSRB).

A number of major study programs, policies and agreements affecting the SSRB have brought water management in the basin to its present status.

The first significant agreement was the signing of the *Master Apportionment Agreement* in 1969. This agreement guarantees that 50% of the combined flow of the three sub-basins will pass into Saskatchewan in each year. This places a significant demand on the Red Deer basin which on average contributes about 80% of its annual flow.

The ***"Red Deer Flow Regulation Planning Studies"*** were completed in June of 1975. The objective of the study was to evaluate the feasibility of constructing a dam on the Red Deer river to augment low seasonal water flows. Low water flows have previously resulted in poor water quality and an unreliable water supply for municipalities and industry. This study recommended the construction of the Dickson Dam which was completed in 1983. In addition to alleviating the above problems, the dam also provides some flood control and a variety of recreational opportunities.

A second study program, entitled ***"South Saskatchewan River Basin Planning Program"*** (SSRBPP) was completed in 1984. This program and the subsequent Alberta Water Resources Commission (AWRC) public hearings and report entitled *"Water Management in the South Saskatchewan River Basin, Report and Recommendations"*, based on the SSRBPP study, led to the South Saskatchewan Water Management Policy which now directs water management strategy in the SSRB.

The major recommendations outlined in the AWRC report and the SSRB policy statements are:

1) Multipurpose use is the underlying principle of all water planning, development and management.

2) Instream Needs (INs) would be determined for major streams in the basin to protect water quality, riparian vegetation and other instream uses.

3) The allocation to apportionment would be met by managing all sub-basins in the SSRB in concert.

4) Irrigation expansion guidelines be established with consideration of all other uses (INs) and reviewed by the year 2000. (Basis for the recently proposed *"Year 2000 Review"* initiative.)

5) The true value of water must be recognized to ensure that it is put to its most beneficial use. To achieve this, objectives and guidelines for conservation and efficiency will be developed.

6) Government will continue to be committed to full public consultation.

The *"Order in Council 615/91"* entitled the *South Saskatchewan Allocations Regulation* set out the limit of irrigation expansion in land area (acres) and a condition that these acreages would be reviewed by the year 2000. This review process is known as the *Year 2000 Review of Water Management in the South Saskatchewan River Basin* and it will have important implications for future water management and supply in the Red Deer River.

In 1894, the federal government passed the *Northwest Irrigation Act* which was designed to facilitate irrigation development and regulate the diversion and use of water for other purposes. The underlying principles of this Act were crown ownership and the right of the crown to issues licenses for its use.

In 1930 the federal government transferred jurisdiction over natural resources to the provinces resulting in the 1931 *Alberta Water Resources Act.* Although this Act has had several minor modifications since 1931, there have been substantial changes to the ratio of supply to demand. Ever increasing demands on our water resources necessitated a review of the Act to allow more efficient and effective management. The outcome of this review was the new *Water Act* which came into affect on January 1st, 1999.

The *Environmental Protection and Enhancement Act* (EPEA) became law in 1992, replacing/ amending nine previous Acts. This Act provides the legal foundation for protecting and enhancing our environment now and in the future. It is relevant to the IMP because it addresses aspects of water quality as well as activities which may occur within or impact the Red Deer River Corridor planning area. The major items are:

- Water Quality
- Land surface conservation and Reclamation Act
- Groundwater Development Act
- Hazardous Substances and Pesticides

Water Supply:

In an average year the SSRB has an estimated average annual yield of approximately 9.5 million dam^3 with the Bow contributing 4.1 million dam^3 (43%) the Oldman 3.4 million dam^3 (36%) and the Red Deer 2.0 million dam^3(21%) of the total*. The Red Deer however contributes an average of about 80% of its total annual yield to apportionment.

It is very important to recognize that the total annual yield for the South Saskatchewan (stated above as 9.5 million dam^3 on average) has been recorded as low as 5 million dam^3 and a high as 16 million dam^3. This highly variable yield can cause difficulties in both the SSRB as a whole

* dam^3 = one cubic decametre = 10m x 10m x 10m. 1.23 dam^3 is equivalent to one acre foot of water; an acre foot being the volume of water that is required to submerge an acre of land in one foot of water.

and more specifically for the purpose of this study, the Red Deer Basin, in meeting demands, particularly during the low flow periods.

Water Demands:

The demands in the Red Deer Basin encompass the apportionment agreement, INs, domestic, agricultural, municipal, industrial and recreation users. The demands vary in time, place and quantity, complicating the selection of management options to meet these demands (see Table 2 and Figure 4 for water license information on the Red Deer River).

Objectives:

1. To manage the basin as stated in the South Saskatchewan Water Management Policy and in accordance with the water resource legislation.

2. To manage water resources in support of the economic and social objectives of the Province with the key principal being multi purpose use.

3. Management of the water resource will reflect existing license allocation, priorities and policy obligations.

Dickson Dam:

The Dickson Dam is a large multi-use structure providing a wide range of benefits not only to the immediate area but also to reaches two to five.

In the immediate area bordering Glennifer Reservoir are a number of recreation facilities such as boat launches, campgrounds and RV sites. In addition to aesthetics, the reservoir provides fishing and boating.

In reaches two to five the dam's operation targets are to provide guaranteed water supplies, flood protection, improved water quality, hydroelectric generation, improved fishing opportunities and assist in meeting INs in the South Saskatchewan as well as obligations under the apportionment agreement.

Instream Needs and Objectives:

Instream Needs are the flow and water quality requirements needed to sustain instream uses of the river. For the Red Deer River, these uses include maintenance of fish habitat, riparian vegetation and recreation. Instream needs are based on scientific studies and do not involve the setting of priorities for allocation of available water.

At times, the needs of different uses of the river (including withdrawals of water for consumption by agriculture, industry, municipalities and individuals) will conflict with the instream needs. This requires the setting of priorities to decide which uses will receive the available flows.

Instream Objectives describe the results of such priority setting and document a societal decision that establishes the basic split between the amount of water that is available for consumption and the amount that must remain in the river to meet instream uses. Because it is meant to reflect

societal choices, the process for setting Instream Objectives involves obtaining input from a wide range of stakeholders. The instream needs information described in this document provides the background information upon which such choices can be made with an appreciation of the implications of such choices. Instream Objectives for the Red Deer River will be set in the *Year 2000 Review of Water Management in the South Saskatchewan River Basin*. Public/stakeholder input will be an important source of information for the development of Instream Objectives in the Red Deer River. Local Authorities will also be a key source of information for this process.

Water quality conditions in the Red Deer were studied with a view towards defining flow conditions necessary to provide adequate water temperature and dissolved oxygen to support the species of fish used in the setting of physical habitat for fish. Extensive water quality studies conducted as part of the IN work determined that dissolved oxygen is unlikely to be a problem during open water conditions. During the winter period, a minimum release 16 cubic metres per second (cms) is maintained from Dickson Dam to ensure adequate under-ice oxygen.

During the summer, high water temperatures are common in the river as the water temperature is controlled primarily by air temperature. The river is broad and shallow, so flow has little affect on water temperature. In addition, controlled studies could only be carried out down to flows of 25 cms. While there might be a lower flow at which temperature concerns would be significant, there are presently insufficient data to set such a lower limit.

Recreation flow needs were determined for all reaches of the river and are described in the respective reach specific sections. The recreation uses considered included wading, swimming, canoeing, power boating, rafting and tubing. In general, recreation needs have not been used to set instream requirements. Rather, the approach has been to use the needs to examine the impacts of alternative water management scenarios, since most scenarios seem to maintain good recreational opportunities.

Instream Needs and Riparian Forests:

The IN studies also examined riparian forests along the river to determine the flow conditions necessary to sustain them. In general, the results of this work indicate that flows should be managed following floods to minimize the rate at which the river drops as it returns to levels that are close to normal. This would not conflict with reservoir operations to provide flood protection which would remain a first priority.

The controlled reduction of flow allows seeds that have been released by the trees to germinate and grow in moist conditions. If the river drops too quickly, the roots are unable to obtain moisture and the trees will die. In addition, it is necessary to maintain certain minimum flow conditions in the year after a major flood so that young trees can establish deep enough roots to survive future low flow conditions. It is expected that specific reservoir operations necessary to sustain the forest would occur only very periodically and would not likely conflict significantly with other water uses. Work in this area continues.

Wetlands:

Wetlands adjacent to the river are vital, integrated components of the river valley's aquatic and terrestrial ecosystems. Aquatic ecosystems support the greatest biological diversity of all ecosystem types, providing habitat for a wide variety of birds, mammals, amphibians, invertebrates and plants. Many wetland species are important links in complex food chains that

are typically found in aquatic and riparian ecosystems such as those in the Red Deer River valley (see *Wetland Management in the Settled Area of Alberta: An Interim Policy*, 1993).

Water quantity and quality issues in the Red Deer River are related to the surrounding wetlands and cannot be managed in isolation. The new *Water Act* (effective January 1, 1999) requires the development of a provincial water planning framework for water management planning. The framework must include a strategy for the protection of the aquatic environment (*Water Act*, Section 8 (1)). This strategy is currently under development and will be used to direct the management and protection of water resources in the province.

Objective:

1. To ensure the protection and sustainable management of wetlands in the corridor.

Guideline:

1. The protection and management of wetlands in the corridor planning area will be directed by the *Water Act*, water management plans and the wetland policy (*Wetland Management in the Settled Area of Alberta: An Interim Policy*).

2.2.15 Wildlife Resources

The Red Deer River Corridor has significant wildlife resources which are used by all Albertans. This use may be: direct (both consumptive and non-consumptive); indirect (where the social value of wildlife is acknowledged) and economic (where wildlife related activities contribute to the economy). Public meeting summaries contained many comments regarding the protection of habitat and wildlife, an indication that wildlife values are important to people who have an interest in the corridor. Currently, good wildlife resources exist throughout the planning area. In order to maintain these resources, land and water use should strive for minimal or no impact on wildlife.

Two sets of factors affect wildlife in the corridor; breeding habits of species and the environment available. The breeding habits are biologically fixed whereas the environmental factors can be somewhat manipulated. In order to support the varied components of disturbance, habitat and range of different species in the same area, an ecosystem approach to habitat management is necessary.

Wildlife concerns include the loss of general habitat from major developments and the accumulative effects of smaller developments. Some habitat types are of special concern and these include cottonwood forests, sage flats and isolated conifer stands. It is also important to maintain wintering areas and travel corridors.

The Red Deer River from Sundre to the Saskatchewan border flows through several natural regions or ecosystems. The canyons, coulees and tributaries along the river valley also provide many smaller ecosystems such as boreal forest, badlands and wetlands. This diversity supports a wide range of wildlife species using the Red Deer River corridor planning area including several rare, vulnerable, threatened and endangered species.

Table 2 - Licensed Surface Water Approvals in the Red Deer Basin as of November 9, 1998
Licensed Annual Diversion (Cubic Decameters), By Activity

	Business		Dewatering		Irrigation		Municipal		Storage	
LOCAL AUTHORITY	# Licenses	Annual Diversion, dam3	# Licenses	Annual Diversion, dam3	# Licenses	Annual Diversion, dam3	# Licenses	Annual Diversion, dam3	# Licenses	Annual Diversion, dam3
Acadia #34	71	535.18	1	0.00	26	2968.34			3	143.08
Badlands #7	5	13.55			18	625.37	3	4107.49		
Bighorn #8	3	66.61	3	0.00						
Camrose #22	1	2.47			1	11.10				
Clearwater #99	45	3767.90	6	38.24	6	199.82			4	326.87
Cypress #1	19	224.44			7	654.97				
Foothills #31					1	32.07				
Greenview #16	1	1235.00								
Kneehill #48	180	1229.34	18	641.41	33	1459.82	2	1581.32	2	88.81
Lacombe #14	76	21654.70	22	4341.85	23	1045.40	1	107.31	5	5588.90
Lamont #30			1	0.00						
Leduc #25			1	0.00						
Mountian View #17	105	4294.94	25	0.00	17	566.14	2	10.45	6	558.76
Newell #4	26	247.83	3	0.00	3	196.12			1	23.44
Paintearth #18	30	159.63	2	0.00	18	596.98			8	3290.94
Ponoka #3	40	337.86	9	0.00	7	241.75			1	748.72
Red Deer #23	136	9233.22	35	3034.36	43	3291.64	6	31540.15	22	24950.63
Rocky View #44	32	536.49	15	12.33	9	189.94			1	75.24
Special Area #2	530	30199.88	12	1.23	176	42963.34	6	825.19	104	16558.26
Special Area #3	168	1683.25	9	3083.71	62	11361.54			16	2431.20
Special Area #4	1	877.00								
Starland #47	134	985.30	13	0.00	34	1678.73	5	448.97	10	786.95
Stettler #6	45	625.46	8	0.00	11	711.72	1	1696.04	18	1352.43
Vulcan #2	1	6.16	1	0.00						
Wetaskiwin #10	3	7.38							1	11.10
Wheatland #16	98	755.75	9	197.35	18	1218.66			4	181.32
Subtotals	1750	78679.34	193	11350.48	513	70013.45	26	40316.92	206	57116.65

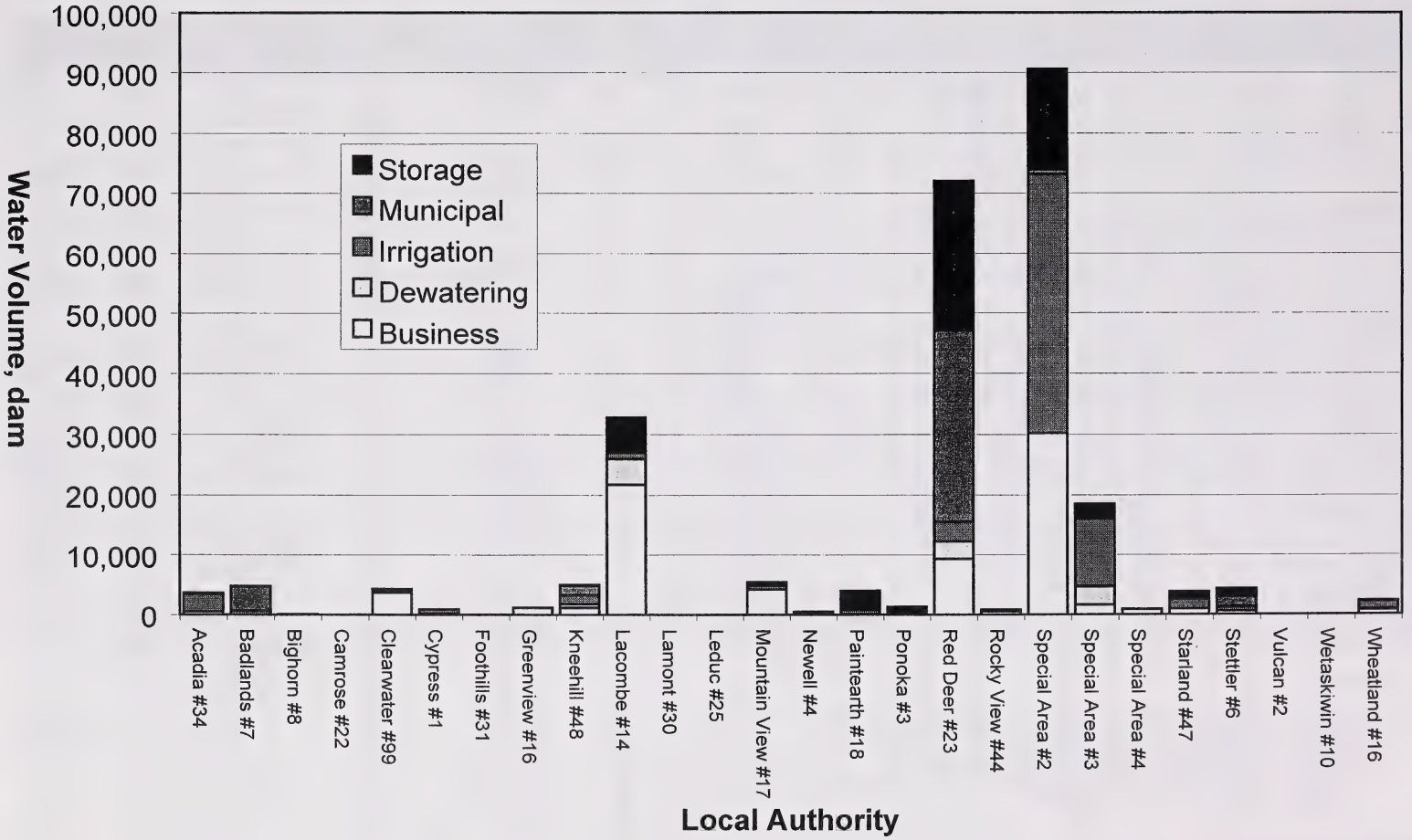
DEFINITIONS:

Business:	includes water supply for animals, oil and gas recovery, hydropower.
Dewatering:	includes lowering of water bodies such as mines and gravel pits.
Irrigation:	includes farm crops, golf courses and parks.
Municipal:	includes urban and rural centres, subdivisions, camps.
Storage:	includes lake level stabilization and habitat preservation (wetlands).
dam3:	"=1000 cubic metres, or 0.8 acre-feet"

TOTALS:

count	2688
diversion	257476.84

Figure 4 - Surface Water Licences in the Red Deer River Basin



Ungulates:

The planning area is within eight wildlife management units (WMUs) which have had varying amounts of inventory for ungulates. White-tailed Deer densities range from 18 per sq. mi. in the lower Red Deer River area, to 0.5 per sq. mi. in the mid river area (which has little White-tailed Deer habitat), to 15 per sq. mi. in the upper parkland area. Mule Deer densities range from 15 per sq. mi. in the lower river, to 18 per sq. mi. in the middle of the planning area, to 8 per sq. mi. in the upper parkland areas. Moose are resident in the planning area from Sundre downstream to Dry Island Buffalo Jump and are seen occasionally downstream from there. Their populations range from 0.25 per sq. mi. up to 3 per sq. mi. Wapiti are seen occasionally on all parts of the corridor. Pronghorn antelope use the corridor downstream of Drumheller in the summer. The sage flats in Reach 5 are important wintering areas for antelope.

Carnivores:

Black bears, Cougars, Bobcats and Lynx are rare and occasional visitors in the corridor. They are monitored through reports, but their numbers are too small and transitory to develop management guidelines. Any habitat needs for these species will be met through protection of habitat for other species.

Furbearers:

The most numerous furbearers in the corridor are beavers and coyotes. At this time neither species is protected on private lands. As coyotes are highly adaptable to human development there is generally not a concern with habitat loss. Protection of riparian areas will adequately protect beaver habitat. Population concerns with these species will be addressed through wildlife management regulations.

Upland Game Birds:

The shrubby vegetation and tree cover associated with the river valley and connecting coulees, downstream of Dry Island Buffalo Jump is important winter cover for Sharp-tailed Grouse. Introduced game birds such as Ring-necked Pheasant, Grey Partridge and Merriam's Turkey are all found in this stretch of river and depend on existing habitats to survive. Upstream from Dry Island, Ruffed Grouse and Sharp-tailed Grouse are found in varying amounts but they depend less on the river because of more upland tree cover adjoining the corridor.

Migratory Birds:

The river and associated wetlands are used extensively by migratory waterfowl during the spring and fall. This use greatly increases if nearby lakes on the upland are low or dry. Waterfowl which nest along the river are Canada Geese, Mallards, Pintails, Common Mergansers, Common Goldeneyes and Buffleheads.

Migratory shorebirds and waders are found throughout the planning area during migration. Some of these birds, which rely on the planning area to nest and feed, are Spotted Sandpipers and Great Blue Herons. Great Blue Herons nest singly or in colonies with up to thirty or more nests. These nesting sites are sporadically located throughout the planning area. These birds have been in a general decline and require protection of their nesting areas.

Songbirds use the planning area extensively for nesting and during migration. Northern warblers need the river valley and its trees in the prairie region for migratory purposes and many species

also nest in the area. Cottonwood groves in the lower reaches are used extensively by cavity nesting birds. Several northern boreal birds nest within the planning area in the unique habitat types along the river. This includes the pileated woodpecker, a primary excavator species which is now re-inhabiting its former ranges throughout the corridor. Cavity nesting species rely on large trees being available.

Raptors:

The planning area is used as a nesting area by several raptors. Ferruginous Hawks (a threatened species), Peregrine Falcons (an endangered species), Prairie Falcons and Golden Eagles use the escarpments and cliff areas for nesting. A major reintroduction program for Peregrine Falcons is taking place with release sites upstream from Content and Morrin bridges. The tree groves and single trees provide nesting for Red-tailed Hawks, Swainson's Hawks, Great Horned Owls, Merlins, Kestrels and Ferruginous Hawks. There are Turkey Vultures nesting near Dry Island Buffalo Jump and nesting Burrowing Owls (a threatened species) along lower river reaches.

Amphibians and Reptiles:

There are several known snake hibernacula in the lower reaches of the planning area. These wintering dens are important for the survival of the Plains Hognose Snake (considered endangered in Alberta), Prairie Rattlesnake, Bull Snake, Red-sided Garter Snake, Western Plains Garter Snake and the Wandering Garter Snake.

The Northern Leopard Frog, which is listed as a threatened species, was present throughout the planning area but now is only found rarely upstream of Drumheller. Fresh water springs are important for this species. Other amphibians found in the corridor are Tiger Salamanders, Plains Spadefoot Toad, Great Plains Toad, Canadian Toad, Chorus Frogs and Wood Frogs.

Objectives:

1. To maintain the wildlife habitat base so that individual wildlife populations are maintained at optimal levels for the habitat available.

2. To maintain wildlife travel corridors. Details on corridor requirements can be determined by provincial wildlife specialists.

3. To provide a variety of recreational hunting opportunities.

4. To provide wildlife viewing opportunities.

5. To provide programs, relating to endangered and threatened species, to promote public awareness and habitat protection.

6. Promote public education of the needs of wildlife and wildlife management practices.

Guidelines:

1. All islands be retained as crown land and have no development. (It is current Public Lands policy to not sell crown lands along or within water bodies.)

2. Work with Public Lands Division to ensure that crown lands under grazing allotment are maintained with at least 50% carryover of grass.

3. Identify important wildlife areas where the stocking rates can be reduced to provide a greater than 50% carryover of grass if it is required for wildlife purposes.

4. Use the referral process to advise other government agencies and developers how to minimize or prevent harmful impacts on wildlife.

5. Developments along the river should have a 100 metre setback from the bank. For development approvals under municipal authority (such as subdivisions), municipalities can determine the need for and size of environmental reserves/setbacks through the standard referral process.

   (*An "environmental reserve" is the proportion of a new subdivision that is retained by the municipality and remains undeveloped as defined in the Municipal Government Act (Part 17, Division 8).*

6. Conduct regular population surveys on game animals.

7. Work with interested partners, through the Watchable Wildlife program, to promote and provide viewing opportunities.

8. Conduct regular population surveys of non-game species.

9. When necessary, conduct population restoration programs. Any restoration program would consider all implications for the area and species in question.

10. Work with interested partners on public education initiatives.

11. Provide individuals with educational information through talks and contacts.

12. Work with private landowners through education and programs to retain habitat on private lands.

13. Development which occurs in or adjacent to wildlife habitat will include measures to control nuisance wildlife and wildlife depredation.

3.0 - REACH-SPECIFIC RESOURCE MANAGEMENT DIRECTION

The corridor-wide objectives and guidelines direction allows for resource management direction to occur in an integrated or coordinated manner throughout the planning area. However, there are differences that occur along the planning area as the river valley conditions, resources and patterns of use change. In order to respect the local differences along the corridor, the planning area was divided into five reaches. These reaches were determined by combining areas of similar natural and physical features, river characteristics and use patterns, and then adapting them to existing municipal boundaries.

While the corridor-wide direction applies to all reaches, the resource management direction provided in the following sections gives additional or more detailed information, objectives and guidelines for individual river reaches. These reach-specific sections are intended to complement and expand on the corridor-wide direction.

3.1 - Resource Management Direction for Reach One

Reach one is 72 km in length, running from west of Sundre to the Dickson Dam. It includes the Mountain View County, County of Red Deer and the Town of Sundre (see map in Figure 5).

3.1.1 Aesthetics

The river valley in this reach is generally broad and flat, with low hills near or at some distance from the river. The riverside is generally densely vegetated with coniferous and deciduous trees and shrubbery. The shores of Gleniffer Lake have limited vegetation cover due to eroding banks and agriculture.

The vegetation cover and flat terrain along the river tends to generally confine views from river level, except where steeper terrain lies close to the river.

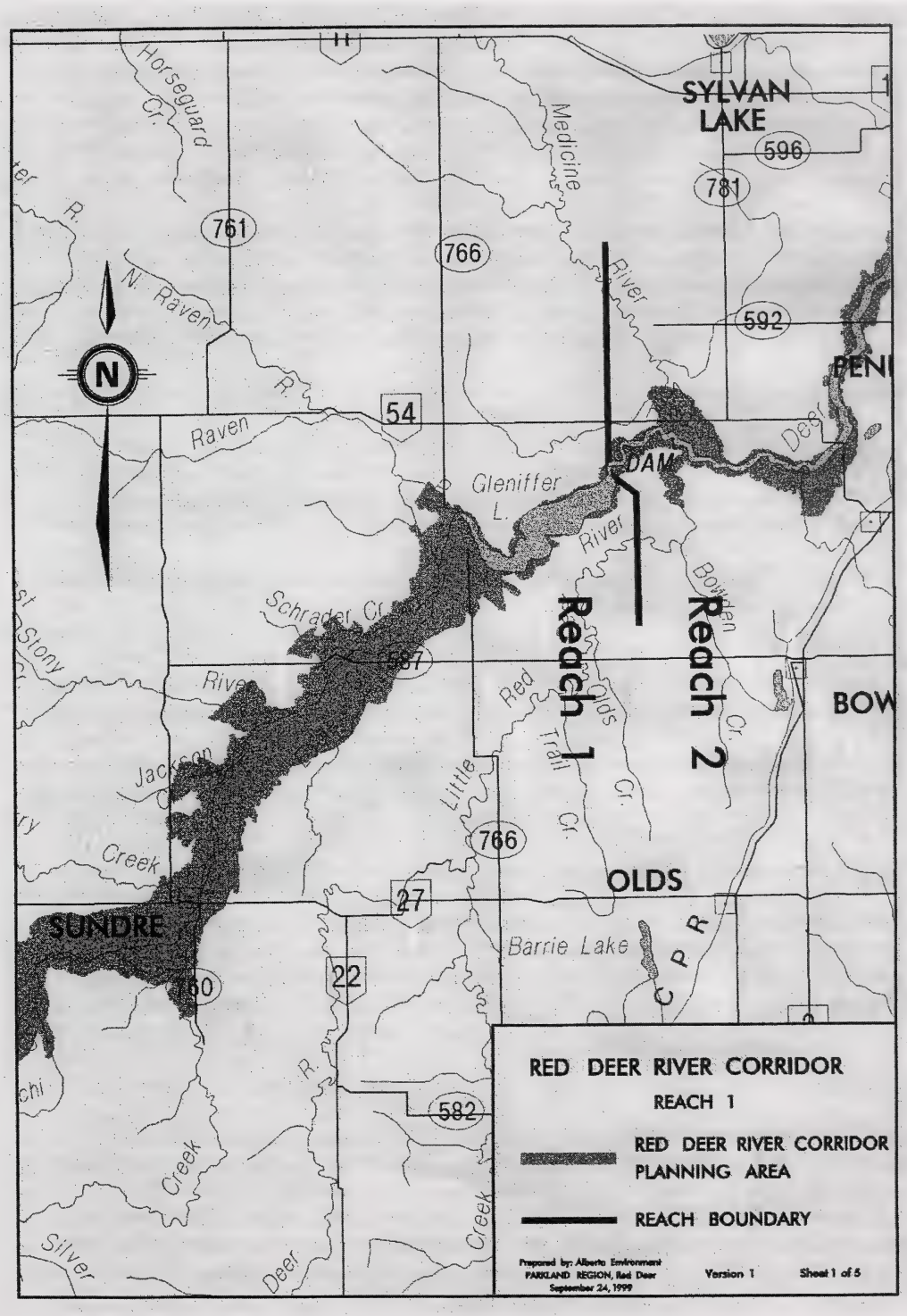
While there is a substantial amount of river recreation use above Sundre, this decreases in the stretch down to Gleniffer Lake. Much of the recreation activity on Gleniffer Lake tends to be power boat oriented and recreationists on the reservoir are expected to have less concern about aesthetics. That is, attention tends to be focused on the activity itself (e.g. water skiing) as opposed to appreciating the surroundings.

There are several public and private recreation sites and developments on the shores of the lake.

Objective:

1. Guide lakeshore development around Gleniffer Lake to ensure that aesthetic values are preserved.

Figure 5 - Reach One



Guideline:

1. Recreational developments and residential structures near Gleniffer Lake should be planned and designed to complement or enhance the lakeshore aesthetics.

3.1.2 Access

River crossings in this reach are at Sundre, Hwy #27, at Garrington, Hwy #587, and on the Dickson Dam. Public access points to the river upstream of the Dickson Dam are few and mainly restricted to the bridges. Topography often limits which road allowances can be developed. There are several private and public access points to Gleniffer Lake.

3.1.3 Agriculture Resources

Objectives:

1. To allow the present level of cultivation on public land to continue. No increase in the acreage will be allowed to preserve native grasslands.

2. To ensure that new or existing Intensive Livestock Operations do not have a negative impact on water quality in the Red Deer River.

Guidelines:

1. No applications for cultivation of native grasslands on public land will be taken.

2. Intensive Livestock Operations will take measures to protect water quality in the Red Deer River.

3.1.4 Environmentally Significant Areas

This reach lies within the Dry Mixedwood subregion of the Boreal Forest Natural Region. There are eight Natural Areas presently designated within the reach. The total area of the Natural Areas in the reach is 591.3 ha. A narrow strip consisting mainly of the riparian zone along the river is identified as regionally significant.

3.1.5 Fisheries

The Red Deer River above Gleniffer Lake (Dickson Dam) can be characterized as a wild, cold water fishery which is not particularly productive. The most common species of native sport fish is mountain whitefish. The major tributary streams are Fallentimber Creek, Bearberry Creek, James River and the Raven River. Bearberry Creek has an impassable weir near Sundre which prevents any fish movement upstream. In addition, the tributary streams have been significantly impacted by both industrial (primarily pipeline crossings) and agricultural activities. There are no instream needs defined for fish upstream of the Dickson Dam.

The Dickson Dam was completed in 1983 creating Gleniffer Lake. The major limiting factor for any fish population in Gleniffer Lake is the annual major water level fluctuations which prevent the formation of any productive littoral zone. This significantly reduces not only the primary productivity of the reservoir but also the availability of spawning and rearing habitat for warm-water species such as pike and walleye. Walleye which have been stocked to augment the native walleye have yet to produce a significant fishery.

One of the most important stocked rainbow trout fisheries in Alberta was created during the construction of the Dickson Dam. The Dickson Trout Pond is located immediately north of upper Gleniffer Lake. This large pond is separated from Gleniffer Lake by a wide berm. The ongoing existence of the Dickson Trout Pond is totally dependent upon the annual inflow of water from Gleniffer Lake in the fall when the reservoir achieves full supply level.

Objectives:

1. To maintain and, where appropriate, enhance all productive fish habitats in order to ensure the continued presence of viable fish populations.

2. To ensure that the water supply for the Dickson Trout Pond is maintained.

3. To restore free fish passage to historic spawning and rearing habitats in Bearberry Creek.

Guidelines:

1. Maintain the current operations of Gleniffer Reservoir to ensure that the Dickson Trout Pond continues to annually receive top-up water each fall.

2. The weir constructed on Bearberry Creek at Sundre should be assessed for possible modification to allow for free fish passage to re-establish the creek's historic spawning and rearing capabilities.

3. Logging of both private and Crown land in the watershed, and especially within any riparian zone, needs to be conducted in such a manner that hydrology, water quality and water temperatures are not adversely affected since these changes can materially affect fish habitat.

4. Industrial developments and agricultural activities along major tributaries (Fallen Timber Creek, Bearberry Creek, James River and Raven River) need to be managed so spawning and rearing capabilities of these streams are maintained.

5. Public access should be maintained for anglers.

3.1.6 Forest Resources

Forest cover in Reach One consists of stands of aspen, balsam poplar, lodgepole pine and white spruce on upland sites. Forest cover has been extensively modified by agriculture on these sites. Coulees, slopes, river terraces and flood plains are generally forested.

This reach includes part of the B02 forest management unit. A forest management unit is an administrative boundary used by Alberta Environment for allocation planning and management of timber resources. Currently, there are no timber quota allocations within the planning area portion of the B02 forest management unit. However, a sustained-yield timber plan for the entire unit is in draft stage.

An estimated 17% of the planning area portion of Forest Management Unit B02 is public land. However, a significant amount of the timber on these lands has been removed and the land converted to native or tame pasture under approved range improvement programs. Generally, forest management planning in B02 will focus on the maintenance of healthy forest conditions and will emphasize protection of natural resource values. For annual allowable cut purposes, the B01 unit is to be combined with an adjacent unit and designated as the B03 unit.

Timber harvesting on public land within a forest management unit is usually carried out on a sustained yield basis on part of the public land. Generally, 60% of white area public land base within a forest management unit is allocated for sustained yield timber management. However, owing to other resource management objectives such as range improvement, emphasis on sustainable timber resources may vary from one area to another within a unit.

Logging on private lands within this reach began to increase in 1993 as market prices for timber increased. The exact area of timber harvesting on private lands in the planning area is unknown.

Mountain View County and the town of Sundre expressed a strong interest in protecting and maintaining the quality of riparian habitat within their jurisdictions. They also prefer to see logged areas retained for forest management rather than clearcut for conversion to open rangeland. Select logging on private land will be encouraged to meet this preference.

Objective:

1. To manage timber on public land in a manner consistent with any management plans for B02 management unit.

Guideline:

1. Activities such as sustainable timber harvesting and range improvement projects will follow approved management plan guidelines.

Forest Protection Area

The extreme western portion of the planning area lies within the Forest Protection Area which includes approximately 27 sections of land. Owing to the extent of land clearing within the Red Deer River Corridor, the risk of forest land wildfire has been substantially reduced.

The Land and Forest Service works in cooperation with local authorities and fire fighting agencies throughout the Forest Protection Area in Alberta in a program called Partners in Protection. The goals of the program are to reduce the risk and severity of wildfires in wildland-urban areas through awareness, education and through cooperation with local authorities and fire fighting

agencies. Other available services include monitoring forest conditions with respect to insects and disease. Dwarf mistletoe is probably found within the planning area.

The following objectives apply to areas where extensive coniferous and mixed stands are subject to subdivision and residential development:

Objectives:

1. To minimize the risk of wildfires in the Forest Protection Area through a coordinated planning approach with local authorities and property owners.

2. To minimize the severity of wildfires in the Forest Protection Area through a coordinated approach to emergency response.

Guidelines:

1. Land and Forest Service (LFS) will carry out programs to increase public awareness of the risk of wildfire, and to educate users of measures that will decrease the risk and severity of wildfire.

2. LFS will take a lead role in a coordinated approach to reducing wildland fire hazard created by structural development.

3. Insect and disease conditions on forested public land will be monitored and controlled within existing programs.

4. LFS will take a lead role in coordinating planning between agencies involved in emergency response in the Forest Protection Area.

3.1.7 Historical Resources

Archaeological Resources

A number of general observations can be made with regard to the reaches of the Red Deer River. Reach Number 1 contains some 98 known sites, but to date these sites are of lesser significance. No significant or designated sites have been recorded here. However, it should be noted that currently known sites are the result of the examination of one small development area, indicating that many more sites remain to be discovered. It should be noted that a discovery of mammoth bone in the area of the James River Bridge was dated to 10,240 +/- 200 years B.P., and represents one of the latest dates for this extinct species in North America. Current research suggests that the earliest human inhabitants of Alberta entered along the Eastern Slopes of the Rocky Mountains and Foothills, and that these early sites may be encountered in the Upper Reaches of the Red Deer River.

Palaeontological Resources - Reach 1 and 2

Headwaters of the Rocky Mountains - The Red Deer River begins in the Rocky Mountains in west central Alberta. The rocks of this area are of Palaeozoic and Mesozoic age. There is currently no record of palaeontological resources in this area.

Foothills to upstream of the City of Red Deer - Within the foothills belt Cretaceous beds have yielded invertebrate and plant fossils, however, good outcrops are not common. Further east, the river winds through the Palaeocene, Paskapoo Formation, but again few good localities have been identified.

Quaternary Palaeontological Resources

Several years ago, a mammoth tibia (leg bone) was recovered from the James River Bridge area. The early postglacial date of 10,240 +/- 200 years B.P. is significant in defining the chronology and order of late Pleistocene events, and further study of the area is in order.

3.1.8 Tourism and Recreation Resources

This stretch of the Red Deer River has the most "natural" section of the river in the planning area. It is generally used for water resource-based activities such as canoeing, rafting and kayaking, particularly above Sundre. However, no recreation requirements were established upstream of Dickson Dam. Gleniffer Lake offers a variety of water-based uses including fishing, boating and swimming. There are three private resort areas and seven recreation sites on the lake, providing a mixture of day use and overnight camping opportunities. Camping is also available at Sundre.

Objectives:

1. To ensure good quality access to Gleniffer Lake is available for the general public for swimming, boating, fishing, picnicking and camping.

2. To encourage recreation activities around the Dickson Dam.

3. To ensure opportunities for quality white water activities above Sundre

4. To maintain recreation and heritage values such that this reach is eligible for designation as a Canadian Heritage River.

5. To encourage small lodge development within this reach as well as commercial campgrounds.

6. To encourage ecotourism and wildlife viewing opportunities.

7. To encourage commercial recreation or tourism activities to be sensitive to the natural characteristics of the area, the visual qualities and the wildlife and treed resources.

3.1.9 Wildlife Resources

Reach one is in the Boreal Foothills ecoregion which is primarily forested by aspen, poplar and lodgepole pine with secondary succession by white and black spruce. In the upland areas, the following types of trees can occur: aspen, balsam, poplar, paper birch, lodgepole pine and white spruce. In the lower, wetter areas, black spruce, willow and alder can occur.

For the larger mammals, which are primarily browse feeders, the understory in the upland forested areas and the willows in the lower areas are important. The stands of coniferous forest are important for thermal cover in the winter and for relief from insects in the summer.

The majority of birds which nest in this area are dependent on trees and shrubs for nest sites and feeding.

Amphibians are dependent on the wetlands within the reach.

There are no significant or outstanding areas within this reach which require special protection, however, the wildlife resources within this reach require that certain constraints be placed on development in order for them to survive at sustainable levels.

Wetlands, springs and small streams should all be protected from any development. They are required by all types of species for water and food.

Woody cover types that are diverse in species composition and height create an interspersion of food and cover that makes this area attractive to wildlife. Lineal tracts of woody vegetation along the river and around wetlands and along streams is very important for travel corridors.

Objectives:

1) Maintain the present habitat diversity, especially the mixed forested areas.

2) Maintain wildlife travel corridors along rivers, streams and around wetland areas.

3) Maintain protected wintering areas for large ungulates.

Guidelines:

1) Provide input into timber harvesting projects to maintain the present habitat structure.

2) Apply 100 metre industrial development setbacks from the high water mark of the river, tributaries, and wetlands. For development approvals under municipal authority (such as multi-lot subdivisions), setback requirements should be determined through the standard referral process where input is gathered from provincial wildlife experts.

3) Provincial wildlife experts should provide input into road developments to limit access into areas which are important to wildlife.

3.2 - Resource Management Direction For Reach Two

Reach 2 is fifty kilometres in length, running from the Dickson Dam to Highway 2. It falls within the County of Red Deer (see map in Figure 6).

3.2.1 Aesthetics

The river valley in reach 2 is sinuous, narrow and well-defined above secondary road 592, after which it changes to terraced valley slopes. The vegetation is generally spruce and poplar woodland with short stretches of diverse riparian woodland, shrubbery and wetland.

The areas visible from the river are restricted by valley walls and riverside vegetation. Significant public use areas are the Fort Normandeau Historic Site and picnic sites immediately below the Dickson Dam. The reach is used by a wide variety of boaters (tubers to jet boaters) due to its proximity to the City of Red Deer. Fishing is also a popular activity in this reach.

Objectives:

See corridor-wide objectives.

Guideline:

1. A historic landscape should be maintained around the Fort Normandeau Historic Site. There should be no development or structures visible from this site.

3.2.2 Access

River crossings in this reach include a bridge west of Innisfail, Hwy #54, a bridge west of Penhold, Hwy #592 and two bridges on the Highway # 2 crossing. Other public access points are limited to a few road allowances or recreation areas such as Fort Normandeau.

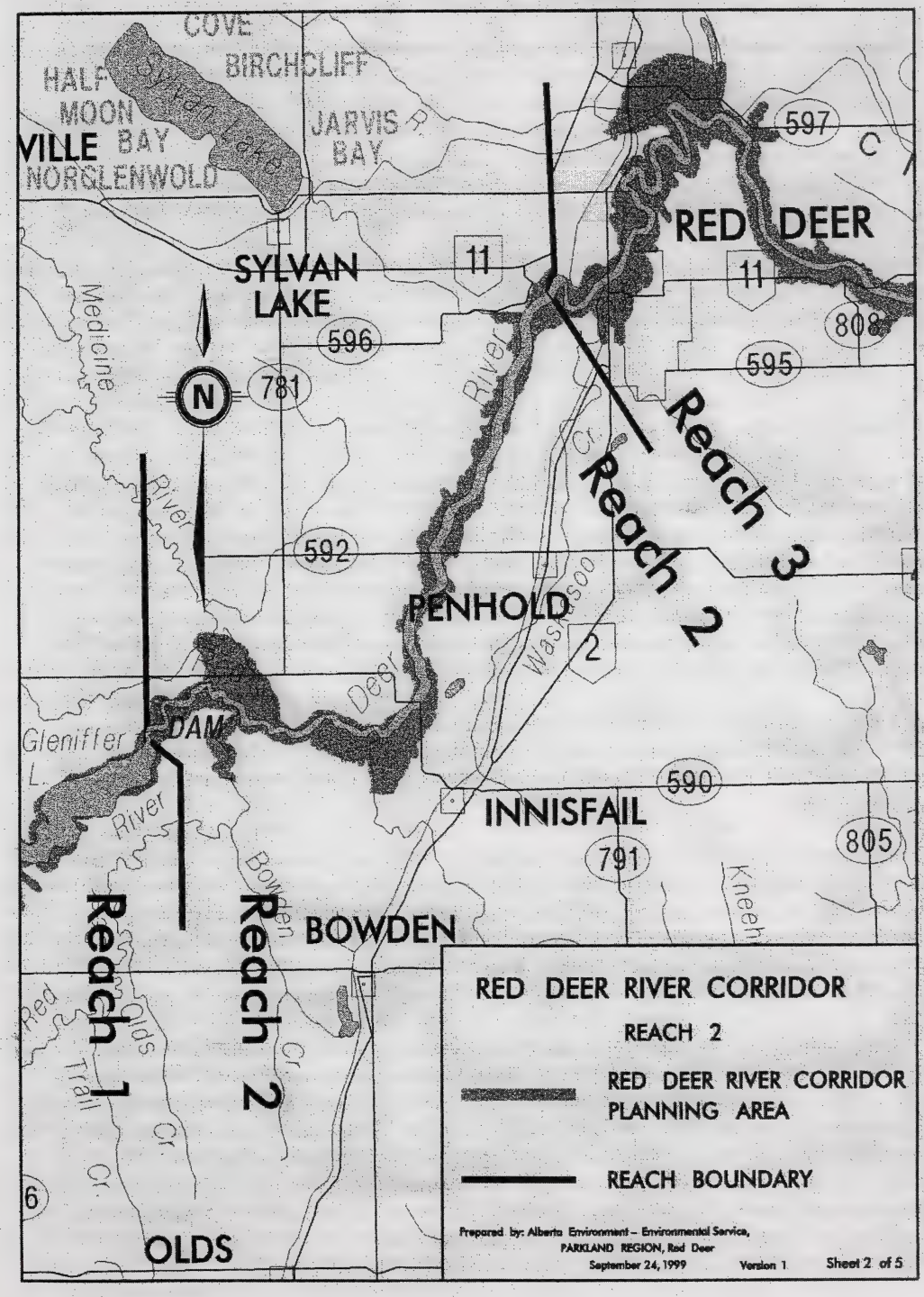
3.2.3 Agricultural Resources

Objectives:

1. To allow the present level of cultivation on public land to continue. No increase in the acreage will be allowed to preserve native grass.

2. To ensure that new or existing Intensive Livestock Operations do not have a negative impact on water quality in the Red Deer River.

Figure 6 - Reach Two



Guidelines:

1. No applications for cultivation of native grasslands on public land will be taken.

2. Intensive Livestock Operations will take measures to protect water quality in the Red Deer River.

3.2.4 Environmentally Significant Areas

This reach lies within the Central Parkland subregion and the Parkland Natural Region. One Natural Area (area: 51.8 ha) is located within the reach. Riparian zones of the Red Deer River and Little Red Deer Rivers have been identified as being regionally significant. Virtually all of this land is privately owned.

3.2.5 Fisheries

Since its construction, the Dickson Dam has had a major impact upon fish habitat and populations. This impact is most pronounced between the dam and the City of Red Deer. In this reach, native sportfish populations are primarily mountain whitefish, walleye and pike. In addition, an introduced self-sustaining population of brown trout has been established. This reach, along with the one downstream of the city, is the most productive and supports the most diverse fish populations anywhere in the Red Deer River. This is the result of many factors including the presence of the Dickson Dam, the change from cold water to warm water and the nutrients and silt from major tributaries.

This diverse and productive fishery attracts provincially significant angling demand from a large local population base. Once the brown trout population is fully established and the walleye population recovered, there may be potential to support local guiding businesses similar to those on the Bow River.

The historic distribution of fish populations has been altered by the presence of the Dickson Dam. Not only did the dam block some traditional migrations, but it also extended the cold water zone further downstream. This has enhanced the habitat for mountain whitefish and brown trout. However, the enhanced cold water fishery below the dam has generally moved the pike and goldeye populations downstream from historic ranges. Between the Medicine River confluence and the City of Red Deer, the river slowly returns to its historic configuration.

Native walleye continue to occupy their historic range but the population has been heavily over-exploited. The population is currently collapsed and under special recovery management. Recovery of the walleye population will be highly dependent upon continued successful spawning and rearing in the lower Medicine and Little Red Deer Rivers. Water quality and habitat maintenance in these tributary watersheds will be very important for walleye recovery. The Medicine River is the most significant because it is where the majority of the Red Deer River walleye appear to spawn. The stability of this area is threatened by past gravel mining and flood events. The Medicine River also appears to have been impacted by traditional agricultural activities. Livestock operations near the river are an identified problem.

Objectives:

1. To maintain and provide for habitats which are necessary for the ongoing recovery of native walleye and the establishment of introduced brown trout populations.

2. To maintain river channel integrity at the Medicine River confluence.

3. To maintain and provide the physical, water quality and water flow parameters required for all productive fish habitats in order to ensure viable fish populations.

Guidelines:

1. Maintain the current operations of Gleniffer Reservoir to ensure that minimum winter flows are enhanced and that the fisheries IN objectives will be maintained for brown trout, walleye and rocky mountain whitefish.

2. Maintain the current passive operation of the hydro-electric plant at Dickson Dam to ensure the stable daily river flows which are necessary to maintain productive downstream fish habitat.

3. The integrity of the lower Medicine and Red Deer River confluence must be maintained to protect the most important identified walleye spawning and rearing area in the upper Red Deer River basin.

4. On-going efforts to reduce the deterioration of water quality in the Medicine and Little Red Deer Rivers, by intensive livestock operations (in particular winter feeding), should be continued with the landowners.

5. Public access should be maintained for anglers.

3.2.6 Potable Water Quality

The Red Deer River is utilized as a raw water source for several municipal and private water systems. The City of Red Deer draws water from the river to provide potable water to over 60,000 residents of the city. The Mountview Regional Water Commission operates the Anthony Henday Water Treatment Plant which provides potable water to an additional 20,000 people in the Towns of Innisfail, Bowden, Olds, Didsbury and Carstairs.

In total, there are over 80,000 people living in Reaches 2 and 3 who rely on the Red Deer River for their drinking water. The provision of clean, safe drinking water is therefore of utmost importance. The Red Deer River must be protected from activities which would adversely affect drinking water quality.

Objectives:

1. To prevent incidental and long term contamination of the Red Deer River.

2. To continually improve the management of water and the water basin by existing and future water users and basin residents.

3. To ensure that the Red Deer River remains a viable source of clean drinking water for populations relying on it today and in the future.

Guidelines:

1. Identify existing and potential locations for water management improvement and ensure they are sited and managed according to best management practices within the planning area.

2. Incorporate best management practices into long-term development plans to ensure that future developments meet the social and environmental objectives for the planning area.

3.2.7 Forest Resources

A small part of this reach is located within the R01 Forest Management Unit. However, there has been no coordinated forest management planning for this unit due to the small area of public forest resources located there.

Objective:

1. To manage forest resources on public land on a sustainable basis or consistent with range improvement programs.

Guideline:

1. Forest resources on public land will be managed on a case-by-case basis consistent with existing procedures and policies.

3.2.8 Historical Resources

Archaeological Resources

Reach 2 has received little investigation and only four archaeological sites are currently known. Site densities may be lower in this zone but these low site numbers may simply reflect a lack of research. The area is considered to have medium to high potential for the discovery of additional sites.

Palaeontological Resources

Reaches 1 and 2: Headwaters of the Rocky Mountains - The Red Deer River begins in the Rocky Mountains in west central Alberta. The rocks of this area are of Palaeozoic and Mesozoic age. There is currently no record of palaeontological resources in this area.

Foothills to upstream of the City of Red Deer - Within the foothills belt, Cretaceous beds have yielded invertebrate and plant fossils, however, good outcrops are not common. Further east, the

river winds through the Palaeocene, Paskapoo Formation, but again few good localities have been identified.

3.2.9 Tourism and Recreation

Reach 2 has a number of natural resource-based attractions. These include regionally significant habitat areas of the Little Red Deer River/Sand Hills, the Red Deer River - Penhold, and the Penhold - Innisfail Wetlands.

The area is used for water-based recreation and has two campgrounds below the Dickson Dam as well as canoe access points.

Reach 2 of the IMP encompasses "recreation segments" 2 and 3. The boundary between recreation segments 2 and 3 is the Highway 592 bridge. The flows required to support recreation activities in Reach 2 are described in Tables 3 and 4 below:

Recreation Tables for "Recreation Segments" Two and Three Within Reach Two

Table 3

Recreation Segment 2 Dickson Dam to Hwy 592 bridge	Range of flows in cubic metres per second	
Activity	Min.	Max.
Wading	5	25
Tubing	7	
Canoeing	20	
Swimming	5	10
Rafting	31	
Power Boating	93	

Table 4

Recreation Segment 3 Hwy 592 bridge to Hwy 597 bridge	Range of flows in cubic metres per second	
Activity	Min.	Max.
Wading	5	65
Tubing	7	
Canoeing	40	
Swimming	5	22
Rafting	65	
Power Boating	90	

Objectives:

1. To ensure that water-based recreation access points are maintained.

2. To ensure opportunities are available for water-based tour operators.

3. To encourage small lodge and campground developments.

4. To encourage ecotourism and wildlife viewing activities.

5. To encourage commercial operators and individual recreationists to respect the natural character of the river valley, its visual qualities, wildlife and forest resources.

6. To maintain recreation and heritage values such that this reach is eligible for designation as a Canadian Heritage River.

3.2.10 Wildlife Resources

The Wildlife Resources section is the same for reach two and reach three because of similar habitat which gives them similar wildlife values.

These two reaches flow through the aspen parkland ecoregion. It starts in the aspen subregion and then the river basically divides the aspen subregion from the groveland subregion to just north of Red Deer. Reach 3 below Red Deer is entirely within the groveland subregion.

This ecosystem consists of aspen copses on the upland river breaks and benchlands intermixed with grasslands. This mix allows for excellent shrub communities and provides good ungulate habitat for white-tailed deer, mule deer and moose. North facing river breaks have many stands of coniferous trees which are valuable for thermal cover in the winter and escapement from insects in the summer. The groveland subregion differs from the aspen subregion mainly in the amount of aspen and the interspersion of grassland.

Reach 2 has topography similar to reach 1. Protection of travel corridors, setbacks from wetlands and minimizing road access are important. Reach 3 flows through the Red Deer Canyon and has steeper river break topography. Cliff faces in this reach are important for nesting raptors, especially Prairie and Peregrine Falcons, and need protection in the form of development setbacks and timing windows for nearby development activities. In the river breaks of this reach, there are perched wetlands which provide very important water and food sources for several species. White spruce groves on the river breaks provide nesting for some locally rare birds which usually nest in the boreal forest. These groves also provide important summer and winter thermal cover for wildlife.

Special consideration must also be given to the great blue heron colonies in reach 3. Considerations should include setbacks and timing windows to prevent disturbance during nesting and brood rearing periods.

The east end of reach 3 flows through the Pine Lake moraine which has knob and kettle topography in the upland. This area is of prime importance to wetland birds.

Objectives:

1. Maintain the diversity of wildlife habitat.

2. Maintain travel corridors along rivers, streams and coulees.

3. Maintain undisturbed wintering areas for large ungulates.

4. Protect steep river breaks for raptor nesting sites.

Guidelines:

1. Manage public land timber harvesting projects to maintain the present wildlife habitat structure.

2. Limit new road development access into areas which are important to wildlife.

3. Development setbacks of 100 metres from river breaks (top and bottom), with historical, present or potential raptor nesting sites, and from the high water marks.

4. Special considerations be given to setbacks at the top and bottom of river breaks which provide wintering habitat for ungulates and nesting habitat for birds. A 100 metre setback is recommended.

3.3 - Resource Management Direction For Reach Three

Reach 3 is 80 kilometres in length, running from the highway 2 crossing to highway 21. It passes through the County of Red Deer, Lacombe County and the City of Red Deer (see map in Figure 7).

3.3.1 Aesthetics

This reach includes the Red Deer Canyon, one of the most impressive valleys in the parklands. The valley is the narrowest of all reaches with steep slopes. Vegetation consists of dense coniferous, deciduous and mixed woodland. The valley contains significant bedrock exposures and minor badlands. Hogsback Ridge and the Dragon's Head sandstone outcropping are noted as scenic features.

Due to the steepness of the valley walls, any development requiring tree clearing in this area would be highly visible both from river level and from other points in the valley. The forest cover has potential to conceal some types of development from view. Much of the planning area (that is, the upland prairie areas) is not visible from river level because of the steep valley walls.

This reach is a popular day trip for canoeists. Outside the City of Red Deer, five recreation sites are noted, including the Canyon Ski Area and four public and private campgrounds and picnic areas. Fishing and wading are also popular at these locations.

3.3.2 Access

River crossings include bridges located in the City of Red Deer (4), south of Joffre on Hwy #11 and at Content Bridge on Hwy #21. There are also several boat access points in Red Deer as well as easy foot access to the river. Downstream of Red Deer, access to the river other than the bridge crossings are few. There are some oil roads on public land which get close to the river.

3.3.3 Agricultural Resources

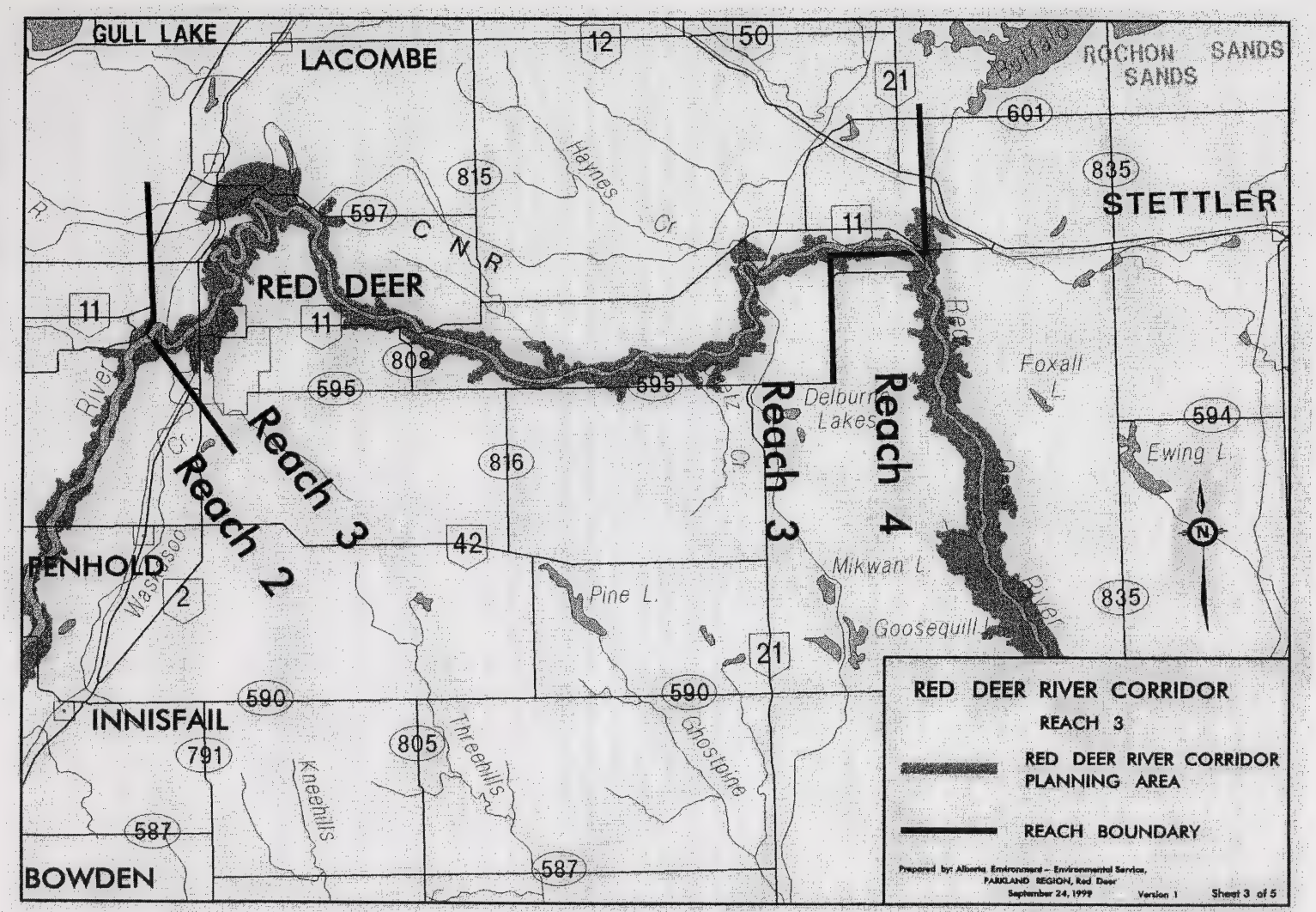
Objectives:

1. To maintain existing irrigation opportunities, and depending on the results of the IN study, allow for increased irrigation opportunities on private land.

2. To allow the present level of cultivation on public land to continue. No increase in acreage will be allowed so native grasslands can be maintained.

3. To ensure that new or existing Intensive Livestock Operations do not have a negative impact on water quality in the Red Deer River.

Figure 7 - Reach Three



Guidelines:

1. Agricultural stakeholders shall be part of any decision making process when irrigation opportunities are discussed.

2. No applications for cultivation of native grasslands on public land will be taken.

3. Intensive Livestock Operations will take measures to protect water quality in the Red Deer River.

3.3.4 Environmentally Significant Areas

This reach lies within the Central Parkland subregion of the Parkland Natural Region. One Natural Area (area: 31.6 ha) is located within the reach. The river valley slopes, valley sides and some upland areas along the valley are identified as being of regional significance (areas around Blackfalds Lake, the Alix Wetlands (Horseshoe Lake area) and the northern edge of the Pine Lake Moraine). Virtually all of this land is privately owned.

3.3.5 Fisheries Resources

Between the City of Red Deer and Content Bridge, native sportfish populations include mountain whitefish, walleye, pike, sauger, mooneye and goldeye. In addition, a few brown trout are beginning to be observed from the population which has become established below the Dickson Dam. This reach, along with the one upstream of the city, is the most productive and supports the most diverse fish populations found anywhere in the Red Deer River. This is the result of many factors including the presence of the Dickson Dam, the change from cold water to warm water, the nutrients and silt from the major tributaries and the sewage nutrients from the City of Red Deer.

This diverse and productive fishery attracts provincially significant angling demand by the large local population base. In particular, there is very heavy participation during the fall mountain whitefish migration.

Reach 3 is the last part of the transition from a cold water fishery to a warm water fishery. This means that trout species give way to warm water species such as walleye, pike, sauger and goldeye. Native walleye continue to occupy their historic range but the population has been heavily over-exploited. The population is currently collapsed and under special recovery management. Recovery of the walleye population will be partially dependent upon continued successful spawning and rearing in the lower Blindman, Medicine and Little Red Deer Rivers. Water quality and habitat maintenance in these tributary watersheds will be very important for walleye recovery.

Objectives:

1. To maintain and provide for habitats which are necessary for the ongoing recovery of the native walleye population.

2. To maintain and provide for the physical, water quality and water flow parameters required for all productive fish habitats in order to ensure the continued presence of viable fish populations.

Guidelines:

1. Habitat in the lower Blindman River, another documented walleye spawning area, should be maintained.

2. Lower reaches of the major tributaries (Waskasoo Creek and Haynes Creek) may be locally important spawning and rearing habitats, therefore maintenance of good water quality and stream flows would be desirable.

3. Public access should be maintained for anglers.

4. Existing water quality should be maintained and not be degraded by City of Red Deer effluent.

3.3.6 Potable Water Quality

The Red Deer River is utilized as a raw water source for several municipal and private water systems. The City of Red Deer draws water from the river to provide potable water to over 60,000 residents of the city. The Mountview Regional Water Commission operates the Anthony Henday Water Treatment Plant which provides potable water to an additional 20,000 people in the Towns of Innisfail, Bowden, Olds, Didsbury and Carstairs.

In total, there are over 80,000 people living in Reaches 2 and 3 who rely on the Red Deer River for their drinking water. The provision of clean, safe drinking water is therefore of utmost importance. The Red Deer River must be protected from activities which would adversely affect drinking water quality.

Objectives:

1. To prevent incidental and long term contamination of the Red Deer River.

2. To continually improve the management of water and the water basin by existing and future water users and basin residents.

3. To ensure that the Red Deer River remains a viable source of clean drinking water for populations relying on it today and in the future.

Guidelines:

1. Identify existing and potential locations for water management improvement and ensure they are sited and managed according to best management practices within the planning area.

2. Incorporate best management practices into long-term development plans to ensure that future developments meet the social and environmental objectives for the planning area.

3.3.7 Historical Resources

Archaeological Resources

Reaches 3,4 and 5 contain extensive amounts of uncultivated lands and therefore surface stone feature sites are relatively common. In a provincial context, uncultivated lands are relatively rare and therefore represent a very important remnant of the former unbroken prairie. While the significance of rare sites such as medicine wheels is undisputed, it should be noted that tipi ring sites contain important clues to past social organization and structured land use. It is therefore concluded that uncultivated lands are of particular importance from an archaeological perspective.

Reach 3 contains 59 known archaeological sites. It is anticipated that additional sites are present but as yet undiscovered. The potential for further site discovery is assessed as medium to high dependant upon local topographical situations.

Guidelines:

Community Development requests referral of any plans for improved grazing/cultivation of native prairie within 1 km of the valley breaks in reaches 3, 4 and 5.

Palaeontological Resources

Red Deer to Content Bridge: Beginning just upstream of the City of Red Deer, better bedrock outcrops are encountered and the type section for the Paskapoo Formation is located at the confluence of the Red Deer and Blindman Rivers. Between Red Deer and Content Bridge, there are a number of sites that have yielded very important palaeontological materials. The most notable of these occur on the Blindman River just upstream from its confluence with the Red Deer River and along the Red Deer River at Burbank, Canyon Ski Hill and Joffre Bridge. Several road cuts in the hilly area around the City of Red Deer and Joffre have also produced important palaeontological resources including fossil plants, insects, fish, mammals and other vertebrates and invertebrates. A research team from the University of Alberta led by Dr. R.C. Fox, M.V.H. Wilson and R. Stockey have been working at these localities for many years.

3.3.8 Residential Development

The preservation of agricultural land is a high priority for the County of Red Deer and Lacombe County where there is a lot of pressure for country residential development.

Lacombe County requires that rural subdivisions be developed on lands below 28% of production value. Preferred building densities are CR2 (2-8 acre lots).

Objectives:

1. To restrict country residential development to areas of low agricultural value/productivity.

2. To eliminate or reduce potential conflicts between multi-lot country residential subdivisions and agricultural land uses.

3. To ensure that key wildlife areas are not negatively impacted by residential development.

Guideline:

1. Country residential developments should be directed to areas of low agricultural value to minimize losses to the productive landbase. The County of Red Deer Municipal Development plan outlines procedures and guidelines for protecting key wildlife habitat areas.

3.3.9 Tourism and Recreation Resources

Reach 3 runs almost to Nevis, and includes the City of Red Deer with its many commercial recreation and tourism opportunities. Most opportunities are in the Red Deer area, although there are numerous water-based activities throughout. In Red Deer, there is considerable canoeing, tubing, fishing, wading and park-based activities such as those at Waskasoo Park. There are canoe access points along the reach and near Nevis there are some rapids.

Jet boat use within the Red Deer city limits has been raised as a minor concern due to noise, speed and impact on recreational activities such as fishing and canoeing. Potential conflicts such as this will be monitored as recreational use of the river increases within the city limits. The City of Calgary has some experience with addressing this issue and Red Deer may benefit from this experience should management action be required in the future.

There are commercial and municipal campgrounds at Red Deer and Content Bridge, and an informal campground at Hillsdown Creek. Other features of interest are: Waskasoo Park, Gaetz Lake Sanctuary, Bowers Pond, Paskapoo Canyon, Red Deer Canyon, the Pine Lake Moraine, and the McKenzie Trail Recreation Area, a natural site of significant wildlife habitat which includes picnic, play and water access facilities.

Reach 3 of the IMP corresponds to "recreation segment" number 4. The instream flows required to support recreation activities in Reach 3 are described in Table 5.

Objectives:

1. To maintain water-based access points.

2. To encourage ecotourism and wildlife viewing.

3. To encourage small lodge development.

4. To maintain recreation and heritage values such that this reach is eligible for designation as a Canadian Heritage River.

5. To monitor recreational uses and conflicts on the river and to be proactive in seeking solutions when problems are identified (particularly in the City of Red Deer where recreational use of the river is relatively intensive.)

Recreation Table for "Recreation Segment" Four Within Reach Three

Table 5

Recreation Segment 4 Hwy 597 Bridge to Hwy 21 Bridge	Range of flows in cubic metres per second	
Activity	Min.	Max.
Wading	5	13
Tubing	12	
Canoeing	34	
Swimming	7	25
Rafting	63	
Power Boating	100	

3.3.10 Wildlife Resources

The Wildlife Resources section is the same for reach two and reach three because of similar habitat which gives them similar wildlife values.

These two reaches flow through the aspen parkland ecoregion. It starts in the aspen subregion and then the river basically divides the aspen subregion from the groveland subregion to just north of Red Deer. Reach 3 below Red Deer is entirely within the groveland subregion.

This ecosystem consists of aspen copses on the upland river breaks and benchlands intermixed with grasslands. This mix allows for excellent shrub communities and provides good ungulate habitat for white-tailed deer, mule deer and moose. North facing river breaks have many stands of coniferous trees which are valuable for thermal cover in the winter and escape from insects in the summer. The groveland subregion differs from the aspen subregion mainly in the amount of aspen and the interspersion of grassland.

Reach 2 has topography similar to reach 1. Protection of travel corridors, setbacks from wetlands and minimizing road access are important. Reach 3 flows through the Red Deer Canyon and has steeper river break topography. Cliff faces in this reach are important for nesting raptors, especially Prairie and Peregrine Falcons, and need protection in the form of development setbacks and timing windows for nearby development activities. In the river breaks of this reach there are perched wetlands which provide very important water and food sources for several species. White spruce groves on the river breaks provide nesting for some locally rare birds which usually nest in the boreal forest. These groves also provide important summer and winter thermal cover for wildlife.

Special consideration must also be given to the Great Blue Heron colonies in reach 3. Consideration should include setbacks and timing windows to prevent disturbance during nesting and brood rearing periods.

The east end of reach 3 flows through the Pine Lake moraine which has knob and kettle topography in the upland. This area is of prime importance to wetland birds.

Objectives:

1. Maintain the diversity of wildlife habitat.

2. Maintain travel corridors along rivers, streams and coulees.

3. Maintain undisturbed wintering areas for large ungulates.

4. Protect steep river breaks for raptors nesting sites.

Guidelines:

1. Manage public land timber harvesting projects to maintain the present wildlife habitat structure.

2. Limit new road development access into areas which are important to wildlife.

3. Development setbacks of 100 metres from river breaks (top and bottom), with historical, present or potential raptor nesting sites, and from the high water marks.

4. Special consideration be given to setbacks at the top and bottom of river breaks which provide wintering habitat for ungulates and nesting habitat for birds. A 100 metre setback is recommended.

3.4 - Resource Management Direction For Reach Four

Reach 4 is 140 kilometres in length, running from Highway 21 to the eastern boundary of the Town of Drumheller municipality. This reach includes the Counties of Red Deer, Stettler, Kneehill, Starland and the Town of Drumheller (see map in Figure 8).

3.4.1 Aesthetics

This reach contains three distinct stretches of the river valley: Lousana Canyon, Tolman Badlands and Drumheller Badlands. The first two are identified as environmentally significant areas of provincial importance.

The Lousana Canyon extends from Highway 21 (Content Bridge) to Secondary Road 590 (McKenzie Crossing). This is a narrow, deep valley - the deepest on the Red Deer River and a very impressive feature in the context of the prairies. Much of the valley is heavily forested with white spruce (particularly on east facing slopes), aspen and balsam poplar. There are a variety of shrub and grassland communities (particularly on west facing slopes), as well as extensive slump blocks.

There is considerable topographic variety with numerous terraces, side canyons and benchlands. This variety, combined with the vegetation mosaic, makes it possible for many types of land uses and/or structures to be concealed in the landscape. The general character of this part of the valley is one of wilderness, which is remarkable considering its location in the settled heartland of Alberta.

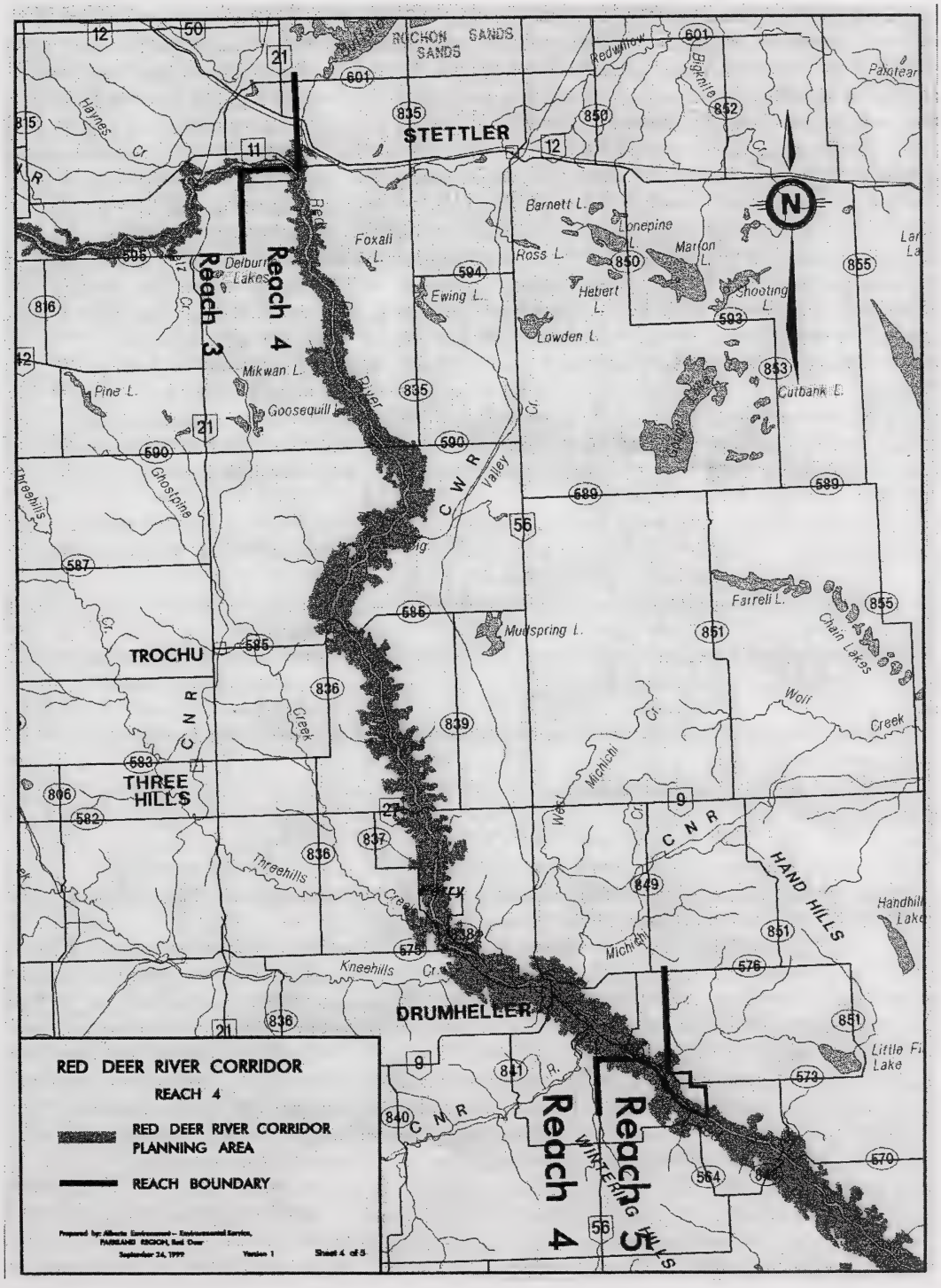
The Tolman Badlands section extends from McKenzie Crossing to the vicinity of Bleriot Ferry. The general physical configuration of the Lousana Canyon (steep valley slopes, narrow) continues in this section but the vegetation changes significantly to a more desert-like landscape dominated by badlands. River terraces in the valley bottom tend to be vegetated with sagebrush and grassland.

The character of the landscape, with barren, open badland slopes and terraces, results in almost any type of structure or land use being very visible. This is the beginning of the badlands part of the valley extending down river to the Jenner area. It is unique and spectacular country, the best representation of badlands in Canada.

In the Drumheller Badlands section, the landscape character is similar but the badlands are more rugged with significant bedrock exposures. There is also more evidence of human activity and disturbance.

Throughout the reach, the topography is very complex with many benches, terraces and tributary coulees that conceal much of the planning area from any given viewpoint, especially from river level. The break of slope at the valley rim tends to be well-defined so areas visible from river level are sharply limited. Where lower river terraces are vegetated only with grasses and low shrubs, dense shrubbery and steep banks tend to conceal these areas from a river level view.

Figure 8 - Reach 4



This reach is traveled frequently by a variety of recreationists, particularly canoeists. The wilderness-like character of the valley, combined with its visual variety and badlands, accounts for much of its appeal. There are also several important parks and recreation sites in the valley. Dry Island Buffalo Jump Provincial Park is an exceptional site in the Alberta park system. The park entrance viewpoint offers a spectacular view of the river valley and surrounding area, providing an important element to the park experience.

An important scenic highway route is also found in this reach. It consists of the North and South Dinosaur Trails which are located in and near the river valley between Drumheller and Bleriot Ferry. This is the only highway route in the corridor that is specifically promoted as a tourism experience and it is closely tied to the tourism attractions centered around the Tyrrell Museum. The route offers views of the river, badlands, upland prairie, Bleriot Ferry, Horsethief Canyon and Orkney Hill. There are a number of additional sites in this reach that draw tourists to view and experience unique natural landscapes. Among these sites are: the Tyrrell Museum, Rosedale swing bridge, the hoodoos and the Atlas Coal Mine.

Tourism is therefore recognized as a very important sector in Drumheller's local economy. With much of the tourism market and experience being connected to the valley's natural beauty, it will be particularly important to ensure that the landscape's visual attributes and qualities are preserved.

Objectives:

1. To maintain the scenic qualities of this reach, particularly as viewed from river level.

2. To maintain the scenic qualities of the landscape visible from the North and South Dinosaur Trails.

3. To maintain the scenic qualities of the landscape as visible from important tourism and recreation sites.

Guidelines:

1. Any new permanent structures visible from the entrance viewpoint of Dry Island Buffalo Jump Provincial Park (within an eight kilometer distance from the viewpoint), should be sited and designed in order to minimize visual impact.

2. Within areas visible from the North and South Dinosaur Trails, particularly from viewpoints and Bleriot Ferry, new permanent structures and land use changes on public land should be avoided or at least designed to blend with the surrounding landscape.

3. In areas visible from important tourism attractions (e.g. Tyrrell Museum, Bleriot Ferry, Rosedale Swinging Bridge, Atlas Coal Mine) the existing landscape should be retained as much as possible. New permanent structures should either be avoided, hidden from view, blended into the surrounding landscape or designed to be consistent with the historical landscape.

3.4.2 Access

River crossings in this reach are at McKenzie Crossing, Hwy 590; Tolman, Hwy #585; Morrin Bridge, Hwy #27; Bleriot Ferry, Hwy #838; Drumheller, Hwy #9 and several bridges on Hwy #10 between Drumheller and the Special Areas boundary. Again, public access to the river other than these bridges is very limited outside the city of Drumheller and towns further downstream. There is a campground at Trenville and the city and towns have recreation areas which access the river. There are trails on private land where farmers and ranchers have accessed the river flats.

3.4.3 Agriculture

Objectives:

1. To maintain existing irrigation opportunities, and depending on the results of the IN study, allow for increased irrigation opportunities on private land.

2. To allow the present level of cultivation on public land to continue. No increase in acreage will be allowed in order to maintain native grassland.

3. To ensure that new or existing Intensive Livestock Operations do not have a negative impact on water quality in the Red Deer River.

Guidelines:

1. Agricultural stakeholders shall be part of any decision making process when irrigation opportunities are discussed.

2. No applications for cultivation of native grasslands on public land will be taken.

3. Intensive Livestock Operations will take measures to protect water quality in the Red Deer River.

3.4.4 Environmentally Significant Areas

The upper half of this reach lies within the Central Parkland subregion of the Parkland Natural Region and the lower half lies within the Northern Fescue subregion of the Grassland Natural Region.

Located within the reach are five Natural Areas, all within the Central Parkland subregion. Total area of the Natural Areas in the reach is 297.3 ha. Dry Island Buffalo Jump Provincial Park (1,179.68 ha) is within the Central Parkland subregion and Midland Provincial Park (598.91 ha) is within the Northern Fescue subregion.

Much of the reach has been identified as having provincial significance (Lousana Canyon and the Tolman Badlands ending just south of Bleriot Ferry). Areas of regional significance have also been identified on the upland level. These areas are in the Ewing Lake Moraine (east of the river) and areas known as Wood Lake and Peter's Pond (west of the river). The Drumheller Badlands

(downstream of Bleriot Ferry) and the Rosebud River valley are identified as being of regional significance.

Almost all land in Lousana Canyon is privately owned. There are a few parcels of public land, some of which are designated as natural areas. About half the land in the Tolman Badlands is privately owned and public land consists of several disjunct parcels. The majority of the land in the Drumheller Badlands is privately owned.

The valley in and around Dry Island Buffalo Jump Provincial Park contains a wide variety of landscapes reflecting the diversity of a transitional zone between natural regions. As a result of the ecological diversity and scenic qualities of the area, the former Brunner Ranch (649.54 ha) was purchased in 1988 for the purpose of expanding Dry Island Buffalo Jump Provincial Park. This parcel is located about 3.2 km south of the park, on the east side of the river. Most of the land in the valley between the two areas is public land.

Objectives:

See corridor-wide objectives

Guidelines:

1. The Counties of Red Deer, Stettler, Starland and Kneehill are currently evaluating the Tolman Badlands candidate site as part of the Special Places program. The Local Committee reviewing the site will make recommendations on site boundaries, acceptable uses and management guidelines and principles. If the site is designated, the committee's recommendations will provide direction for the development of a detailed management plan.

3.4.5 Fisheries Resources

From Content (Nevis) Bridge downstream to Drumheller, fish habitat changes considerably. Both water quality (turbidity) and channel morphology change significantly as one moves downstream. It is very difficult to utilize normal effective fish population sampling techniques under such circumstances. As a consequence, there are insufficient data for this large length of the Red Deer River.

This part of the river is a warm water fishery as indicated by the absence of trout species. All sport fish species are native and these include walleye, sauger, pike, goldeye and mooneye. Lake sturgeon is an additional significant species which is known to occur from just upstream of Drumheller to the border. Lake whitefish would be incidental and some mountain whitefish may still be present near Content Bridge.

Little is known about these populations with regard to spawning and rearing areas. However, it is likely that spawning could take place in both the Red Deer River and its numerous tributary streams. Any cleaner granular substrates in these locations may be important fish habitats, especially for spawning. In the river, these deposits become more scarce, and therefore more valuable, as one moves toward Drumheller. Also, the surrounding valley becomes progressively more unstable and erodible which has a profound effect upon fish habitats.

Objectives:

1. To maintain and provide the physical, water quality and water flow parameters required for all productive fish habitats in order to ensure viable fish populations.

2. To protect all potential fish habitats as equally important until proper data are obtained to determine their significance.

Guidelines:

1. Walleye and goldeye populations found in this reach should be further studied to better understand what their habitat needs are in the middle Red Deer River basin.

2. Gravel mining of deposits within the river channel should be avoided since they could be important fish habitats. These deposits are not renewable and become more scarce downstream. Downstream of the Nevis Bridge (Hwy. 21), removal of riverbed gravel or sand will not be approved unless it can be demonstrated by the proponent that neither river channel integrity nor fisheries habitat will be jeopardized.

3. Lower reaches of major tributaries (Big Valley Creek, Threehills Creek, Kneehills Creek, Michichi Creek and Rosebud River) may be locally important spawning and rearing habitats. Maintenance of good water quality and stream flows at current levels are therefore desirable. Any developments on these tributaries must be assessed to ensure that fish migrations are not being cut off, or other adverse impacts to the fisheries are not occurring.

4. Road construction and pipeline crossings in the riparian zone require special attention to ensure they do not become major, chronic sources of erosion and silt where highly erodible "badland" soils (which cannot be easily reclaimed with vegetation cover) are encountered.

5. Public access should be maintained for anglers.

3.4.6 Forest Resources

The County of Red Deer wants to ensure that any logging on private land is conducted in a responsible manner that does not jeopardize the ecological values and health of the valley.

Objective:

1. Within the County of Red Deer: to ensure that logging on private land is conducted in a sustainable and sound manner that protects the river valley's ecological and aesthetic qualities.

Guideline:

1. Encourage landowners to follow sustainable logging guidelines as set out in this document (page 25) and as provided by the Alberta Private Woodlot Program (1-800-619-5732).

See also Corridor-Wide section, "Riparian Vegetation Management" on page 23.

3.4.7 Historical Resources

Archaeological Resources

Reaches 3, 4 and 5 contain extensive amounts of uncultivated lands and therefore surface stone feature sites are relatively common. In a provincial context, uncultivated lands are relatively rare, representing an important remnant of the former unbroken prairie. While the significance of rare sites such as medicine wheels is undisputed, it should be noted that tipi ring sites contain important clues to past social organization and structured land use. It is therefore concluded that uncultivated lands are of particular importance from an archaeological perspective.

Reach 4 is also under-studied. Despite this, 178 sites are on record, six which are considered to be extraordinarily significant. These sites primarily constitute medicine wheels and are concentrated in lower portions of the reach. Medicine wheels are a very rare site type, with only about 65 known in North America, and the concentration found in reaches 4 and 5 is unusual. There is also a very high density of tipi ring sites along the margins of the valley. Recent research conducted on the valley terraces, in conjunction with energy development, has confirmed the presence of buried campsites which are regarded as being of great scientific value. Potential for the discovery of additional sites is considered to be very high.

Guidelines:

Community Development requests referral of any plans for improved grazing/cultivation of native prairie within 1 km of the valley breaks in reaches 3, 4 and 5.

Palaeontological Resources

Content Bridge to Dry Island Buffalo Jump - As the river winds south from the Content Bridge area, it enters the Cretaceous Scollard and Horseshoe Canyon Formations. These beds contain some of the youngest dinosaur remains known anywhere in the world and provide an opportunity to study the extinction event which occurred at the end of the Cretaceous period. Outcrops in this area are not as good as those located further to the south and there are few well studied sites upstream of Dry Island Buffalo Jump. However, there is every indication that this is a very important area for future research and any new sites discovered here are of great significance.

Dry Island Buffalo Jump to Drumheller - This important section of the corridor includes two provincial parks; Dry Island Buffalo Jump and Midland Provincial Park. Horseshoe Canyon (type section at Horseshoe Canyon west of Drumheller) and Scollard Formations (type section in Scollard Canyon, south of Dry Island) dominate this area and superb outcrops are common along the river and its tributaries. This region is best known for its vertebrate fauna, especially the dinosaurs which have been collected here since about 1910. More than one hundred complete or partial dinosaur skeletons have been excavated here along with a large number of other vertebrates, invertebrates and plant fossils. Another significant feature of this area is the occurrence of the Cretaceous-Tertiary boundary which has been identified at several locations.

In general, any activities that cross the valley breaks, and/or affect bedrock, are considered to have a very high potential for encountering significant palaeontological resources.

Quaternary Palaeontological Resources

Reach 4: Although the museum has few documented Quaternary specimens from the Drumheller area, there is a certain potential for locating such material during excavations, likely along the banks of the Red Deer River and tributary streams. Mid-Wisconsian-age prairie dog colonies have been found on the south valley rim near East Coulee.

It should be noted that mammoth bone has been excavated by Dr. Ian Campbell from some localities within Dinosaur Provincial Park. Although the Park is protected from major development, new finds and new localities should be reported as they are encountered.

3.4.8 Tourism and Recreation Resources

Reach 4 is a very important reach for tourism and recreation resources and opportunities. It has extremely scenic resources with diverse landscapes and deep canyons. It is used extensively by various types of river-based recreationists, particularly canoeists. There is camping along the river but there are few formal campsites either along the middle portion of this reach or along the extreme southern stretch. There are, however, abundant municipal and commercial campsites between Morrin Bridge and Drumheller.

There are natural and cultural resources of regional and provincial significance in this reach: the deep, scenic Lousana Canyon; the Tolman Badlands; Drumheller Badlands and Hoodoos; Horsethief Canyon; Dry Island Buffalo Jump Provincial Park; and Midland Provincial Park. Although neither of the provincial parks contain campsites, day-use facilities are provided. There are 3 provincial recreation areas: Hoodoos, Tolman Bridge and Bleriot Ferry, with the latter two having campsites.

There is an historic Metis settlement site near Dry Island Buffalo Jump and a number of stone features at Rumsey Cairn. There are also numerous historic features in and around the communities between Nacmine and Dorothy (mining buildings, artifacts, miners' cottages etc.). Many of the communities along this reach have commercial attractions that appeal to recreationists and tourists.

Dry Island Buffalo Jump preserves a flat topped mesa in the badlands and an Indian buffalo jump. It also provides a popular water access point for recreationists. Midland Provincial Park has historic mining resources, a buffalo jump and the Royal Tyrrell Museum which is a major tourist destination.

Reach 4 of the IMP corresponds to "recreation segment" number 4. The instream flows required to support recreation activities in Reach 4 are described in the Table 6.

Objectives:

1. To maintain the high quality of river travel experience available between the Highway 21 crossing and Drumheller, and to enhance water-based recreation along the entire lower Red Deer River.

Recreation Table for "Recreation Segment" Four Within Reach Three

Table 6

Recreation Segment 4 Hwy 597 Bridge to Hwy 21 Bridge	Range of flows in cubic metres per second	
Activity	Min.	Max.
Wading	5	90
Tubing	5	
Canoeing	10	
Swimming	2	25
Rafting	33	
Power Boating	60	

2. To encourage tour operators to offer water-based and interpretive tours of the river, particularly through low impact and unobtrusive means.

3. To encourage additional water-based access locations along the river.

4. To encourage the development of appropriate facilities for supporting public opportunities to experience, understand and appreciate the resources of Dry Island Buffalo Jump Provincial Park.

3.4.9 Wildlife Resources

This reach starts in the groveland subregion of the aspen parkland ecoregion and moves southward where it flows through small portions of the fescue grass ecoregion near Rumsey. It then passes through the mixed grass ecoregion to East Coulee. A significant ecosystem in this reach is the start of the cottonwood groves. The topography of the river breaks is steep with about the last half of the reach flowing through badlands topography.

The most abundant large ungulates present are white-tailed deer and mule deer, but moose are present in the aspen parkland portion of the reach. In this aspen parkland area, tree cover on the breaks, benches and river flats is intermixed with native grassland. This combination of habitats provides a good interspersion of food, cover, wintering areas and travel corridors.

The river breaks provide escape and thermal cover for many species of birds and the topography of the river breaks provides nesting areas for raptors. Peregrine falcons, prairie falcons, golden eagles and ferruginous hawks all nest on the escarpments. One of the few places where turkey vultures nest in Alberta is along this reach. Timing restraints and setbacks from available nesting

habitats are important. Small patches of trees in the coulees and draws are important for thermal and escapement cover. The trees also provide nesting and feeding areas for many bird species.

The river bottom flats are a mixture of grasslands and tree/shrub cover. Dominant trees in the north part of the reach are aspen and black poplar. In the southern part of the reach, cottonwoods are dominant. This use area provides important wintering habitat for deer and is used extensively by many nesting and migrating bird species.

The grasslands provide habitat for ground nesting birds as well as foraging areas for birds and ungulates. The small fescue grassland area is very important to protect because it is a threatened habitat. There are several species which are almost exclusive to fescue grasslands including the Baird's Sparrow which is listed as threatened.

Objectives:

1. to maintain undisturbed wintering areas.

2. to maintain wildlife travel corridors.

3. to protect potential raptor nesting sites.

4. to maintain or improve cottonwood forests.

5. to maintain grassland areas and improve grassland cover.

Guidelines:

1. Identify important areas for wildlife and provide input through the referral process.

2. Development/industrial setbacks of 100 metres from the high water mark.

3. Special consideration should be given to development setbacks on the top and bottom of the river breaks with historical, present or potential raptor nesting sites and where important ungulate wintering habitat exists (100 metres is recommended).

4. Work with partners to enhance cottonwood forests through cottonwood regeneration.

3.5 - Resource Management Direction For Reach Five

Reach 5 is 220 km in length, running from the Town of Drumheller eastern municipal boundary to the Saskatchewan border. It includes the Special Areas, County of Newell, County of Wheatland, MD of Acadia and the Village of Empress (see map in Figure 9).

A large portion of this reach is within the Special Areas which was formed in 1938 under the Special Areas Act. Special Areas is unique inasmuch as the Special Areas Act makes provisions for the Special Areas Board to manage the rangeland, farmland and general land use by programs designed to rehabilitate the area. The Special Areas Act utilizes portions of the Public Lands Act and the Municipal Government Act. The Special Areas Board thus acts as both the public and private land manager in the Special Areas portion of this reach. Specific details on the guiding mission, principles, policies, etc. of the Special Areas Board is addressed in the *Technical Background Document* of this plan.

3.5.1 Aesthetics

The Red Deer River valley, through the western half of reach five, is characterized by a flat valley bottom of river terraces through which the river channel meanders between the enclosing valley walls. The valley walls are typically rugged badlands through the Drumheller, Finnegan, Steveville, Dinosaur and Jenner areas. These badlands are very distinct and the most extensive in Canada.

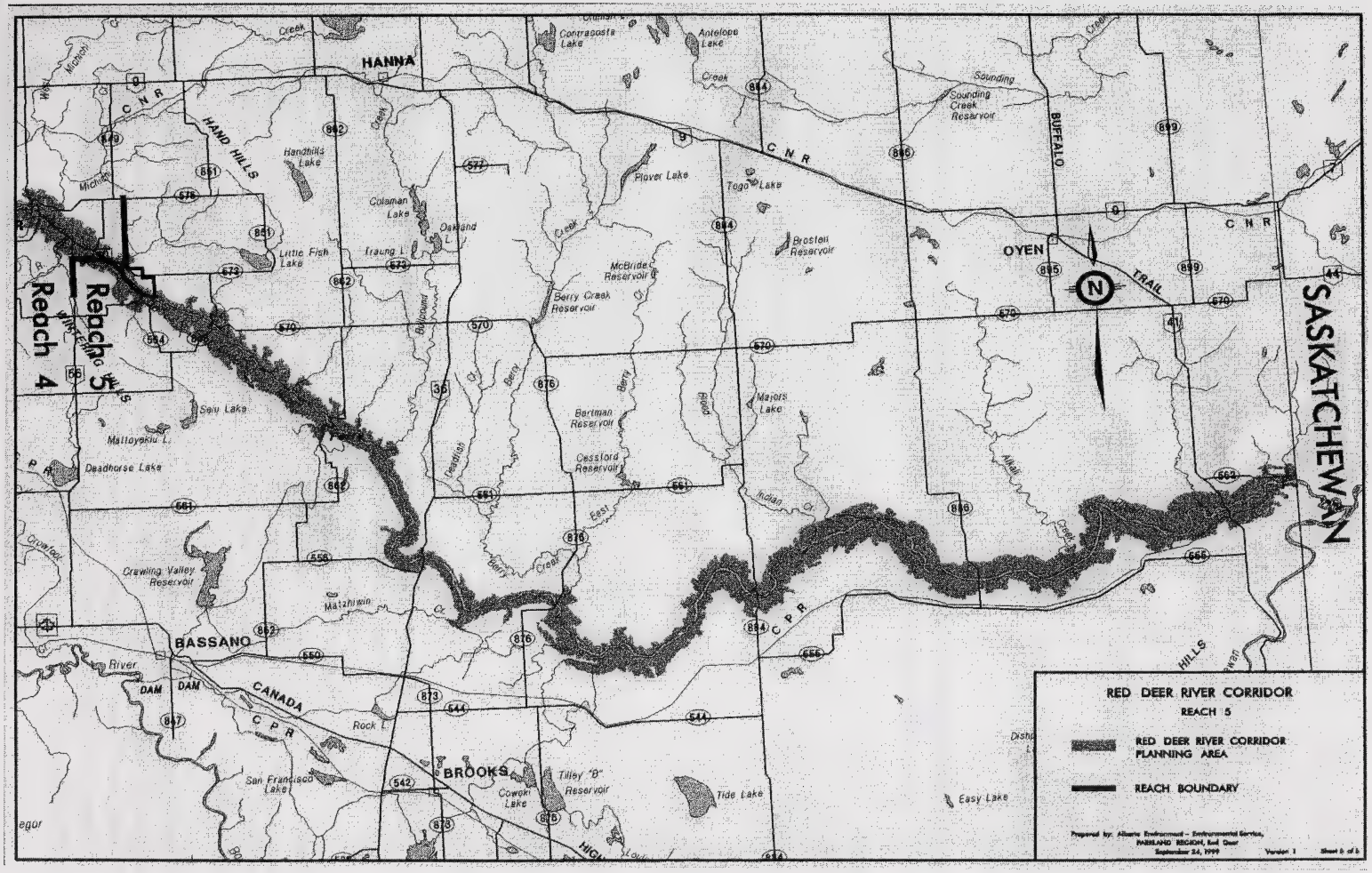
Downstream, the valley walls are less steeply sloped with more grass cover. At various locations throughout the reach, particularly in the eastern section, riparian cottonwood forests are found on the valley floor. A number of springs on the valley sides contribute to the area's visual variety by supporting tree and shrub cover. The Hutton, Douglas Creek and Duchess Springs have been identified as scenic features.

The section of the river valley between Alkali Creek and the Saskatchewan border is noted for its diversity of features and habitats, including riparian cottonwood forests, shrubbery, cutbanks, channel wetlands, grasslands, sand dunes, sagebrush and alkali flats.

In reach 5, there are internationally, nationally and provincially important Environmentally Significant Areas (ESA). The single internationally significant ESA surrounds and includes Dinosaur Provincial Park and one nationally significant ESA includes the cottonwood forests on river terraces between Dune Point and the Saskatchewan border (known as the Bindloss/Empress Terraces). Four provincially significant areas include: (1) the valley between Finnegan and Steveville, (2) the river valley between Dinosaur Provincial Park and an area northeast of Jenner, (3) the valley from Alkali Creek to and including Dune Point, and (4) the Dune Point springs area (valley slopes north of Dune Point).

The valley is generally wider from rim-to-rim in this reach so the area visible from river level is larger than in other reaches. However, much of the planning area on the uplands is not visible from river level. Within the valley, the complexity of terrain results in extensive coulee and

Figure 9 - Reach Five



terrace areas not being visible from river level. Riverside tree and shrub cover in many areas also limits river level views of the valley.

The most visited viewpoint in the corridor is located in this reach at the entrance to Dinosaur Provincial Park. The park is annually visited by tens of thousands of people from all over the world. For many tourists, this view comprises a significant component of their experience. The viewpoint provides a panoramic view of prairie, badlands, riparian forest and the river. The sweeping landscape visible from this point includes significant portions of both park and private lands. A number of years ago, a power transmission line was specifically routed out of sight to protect the integrity of this view.

Some parts of the river are used more frequently for recreational river tripping. The section between Steveville and the bridge north of Jenner is popular due to the dramatic badlands landscapes.

There are several highway crossings of the valley in this reach. The highways are not particularly noted as tourism routes but nonetheless provide a source of scenic variety for travelers.

Objectives:

1. To maintain the visual characteristics of the valley around Dinosaur Provincial Park and World Heritage Site. No new significant visual intrusions should be visible from the river level.

2. To maintain the landscape's aesthetic qualities and attributes at the Dinosaur Provincial Park entrance viewpoint.

3. To maintain the existing landscape character as viewed from river level, visual mitigation techniques should be employed throughout the reach.

4. To maintain the high quality landscape viewing opportunities that are currently available at the Highway 36 and 41 river crossings.

Guidelines:

1. No significant visual changes shall occur within the area visible from river level along Dinosaur Provincial Park and World Heritage Site.

2. Landscape modifications for agricultural or industrial purposes, if potentially visible from the entrance viewpoint at Dinosaur Provincial Park, should not create additional, major visual intrusions. Modifications that do occur should be in keeping with the existing landscape character and employ visual mitigation techniques such as low profile structures painted in earthtone colours.

3. In other areas of the reach, proposals for land use changes and developments should, in conjunction with the landholders and the Special Areas Board or the M. D. of Acadia, consider employment of mitigation techniques to minimize visual impacts from the river level view shed. Industrial developments should include low profile structures painted in earthtone colours.

3.5.2 Access

Uncontrolled access within the planning area is not supported. Economic stability of the farming and ranching community depends upon ongoing stewardship of the land. Control of access is important to the lessees in terms of protecting range condition and limiting harassment to livestock. Provincial policy regarding access on public land recognizes that access generally causes an impact to the planning area and its residents.

There are needs for access by agriculturists, industry, recreationists and the municipality. The Special Areas Board (SAB) recognizes the position of the lessees and will require all visitors or potential developers to acquire a leaseholder's consent for access prior to accessing public land held under lease.

Objectives:

1. To permit the needs of agriculture, industry, recreation, scientific research and the municipality to be fulfilled through consultative processes that involve all affected stakeholders.

2. To maintain the role of the landholders (both public and patent) as stewards and custodians of the land.

3. To ensure the agricultural community continues to pursue their livelihood in a peaceful and unharassed manner.

Guidelines:

1. Access to land within the planning area will begin by contacting the affected landholder. Access will occur by means of a consultative process involving directly affected stakeholders.

2. Public land dispositions offer quiet and peaceful enjoyment of the leasehold benefits. Activities that have the potential to negatively impact the designated benefits shall be negotiated with the lessee.

3. Activities not related to agriculture are recognized to occur in the planning area and there is a demonstrated need to accommodate these other interests. Parties desiring access are strongly encouraged to develop partnerships with the landholders.

3.5.3 Agriculture

Objectives:

1. To maintain existing irrigation opportunities and, depending on the results of the IN study, allow for increased irrigation opportunities.

2. In Special Areas: to define specific range management objectives, in consultation with the Special Areas Range Management Supervisor and landholder, prior to regrassing abandoned cultivation or depleted tame pastures.

3. To allow the existing level of cultivation to continue on public land. In Special Areas, to permit increased cultivation on defined arable land, subject to approval of the Special Areas Board.

4. No feedlots will be established that will impact the quality of water in the Red Deer River.

Guidelines:

1. Agricultural stakeholders shall be part of any decision making process when irrigation opportunities are discussed.

2. Applications to increase permanent cultivation will be reviewed on a case by case basis, in conjunction with the appropriate stakeholders.

3. Applications to increase cultivation on arable land will be reviewed on a site by site basis, in conjunction with key stakeholders. Requests to increase cultivation will recognize the current Special Area Grazing Lease Regulation that prohibits the breaking of native range.

4. Proposals for new commercial feedlots and intensive livestock operations (as defined under the Special Areas Land Use Order) shall take adequate precautions to ensure contamination of the Red Deer River and its tributaries does not occur.

5. No significant developments (as defined under the Special Areas or Public Lands Services Land Use Order) shall occur in the planning area without consultation between the SAB, landholders and other key stakeholders. The SAB and landholders wish to maintain the rural ethic developed by the agricultural lifestyle. The stewardship way of life is critical to maintaining the integrity of the planning area.

3.5.4 Environmentally Significant Areas

This reach is primarily located in the Dry Mixedgrass subregion of the Grassland Natural Region. Limited areas of the Northern Fescue and Mixedgrass subregions are present in the upstream end of the reach. These are comparatively small transitional areas and are identified as being of regional significance.

The two designated and overlapping protected areas in this reach are Dinosaur Provincial Park (6,622.17 ha) and Dinosaur World Heritage Site. On most of the land base, these two entities overlie each other but there are some differences around their respective boundaries. These areas are of international and national significance by virtue of the palaeontological resources, cottonwood forests and badlands landscapes. These same qualities are found on river valley lands adjacent to the park.

Much of the land north and east of the area is public land. Land west and south of the area is privately owned by the Eastern Irrigation District.

Cottonwood forests on the river terraces between Dune Point and Empress are also considered to be of national significance. About half of this land south of the river in (Special Area No. 2) is public land and a similar situation exists north of the river in the M.D. of Acadia.

Four areas in the reach are identified as being of provincial significance. One is the Finnegan/ Steveville terraces extending upstream from Dinosaur Provincial Park to the vicinity of Finnegan. The area is noted for its extensive riparian cottonwood forests and relatively undisturbed valley spring systems. Most land on the north and east side of the river is public land in Special Area No. 2, while land south and west of the river is privately owned by the Eastern Irrigation District.

The river valley downstream of Dinosaur Provincial Park to the Jenner area is also noted to be of provincial significance. This is due to several factors including its diverse character and the continuation of the same qualities of Dinosaur Provincial Park and World Heritage Site. Land south of the Jenner bridge area is public land in Special Area No. 2. The remainder of the land is private, but also within Special Area No. 2.

The third area of provincial significance is the river valley from Alkali Creek to the Dune Point area. This area is noted for a concentration of diverse features including rare plants and unique habitats such as sand dunes and alkali springs. Almost all this land is public land in Special Area No. 2.

The fourth area of provincial significance is the Dune Point Springs area which consists of south facing slopes across from Dune Point. These are alkali springs with diverse coulee woodlands, shrubbery and grasslands containing populations of rare plants and birds. The area lies in the M. D. of Acadia and is about evenly split between private and public land.

Most of the upland areas outside the river valley are identified as regionally significant.

Objectives:

1. To provide opportunities, that are locally driven, for specific protection of identified significant features.

Guidelines:

1. In the Special Areas, the ESA study for the Lower Red Deer River should form the basis for identification of unique and significant sites that may deserve specific protection over and above the measures adopted by the Special Areas Act.

2. A management plan has been prepared for the internationally significant Dinosaur Provincial Park and World Heritage Site. The plan is going to a public review in 1999.

3. The Special Areas Board will prepare management plans and municipal policies for the provincially significant areas in the reach to maintain the integrity of the landscape. This includes Alkali Creek to Dune point (including Dune Point Springs), Finnegan/Steveville Terraces; and Red Deer River - Jenner.

3.5.5 Fisheries Resources

From Drumheller to the border, the fish habitat continues to change. Water turbidity increases and the substrate becomes predominantly sand/silt with very few granular deposits. It is very difficult to apply normal fish population sampling techniques under such conditions. As a consequence, there are insufficient data for this large length of the Red Deer River.

All sport fish species are native and include walleye, sauger, pike, goldeye and mooneye. Lake sturgeon is an additional significant species which is known to occur roughly between Drumheller and the Saskatchewan border. Lake whitefish are also incidental.

Little is known about these populations with regard to spawning and rearing areas, however, it is likely that spawning could take place in both the Red Deer river and its numerous tributary streams. Any cleaner granular substrates in these locations may be important fish habitats, especially for spawning. As in the previous reach, the surrounding valley continues to be unstable and erodible which has a profound effect upon fish habitats.

Objectives:

1. To maintain and provide the physical, water quality and water flow parameters required for all productive fish habitats in order to ensure viable fish populations.

2. To protect all potential fish habitats as equally important until proper data are obtained to determine their significance.

Guidelines:

1. Lake sturgeon and other fish populations in this reach should be studied to better understand what their habitat needs are.

2. Lower reaches of the major tributaries (Willow Creek, Bullpound Creek, Berry Creek, Blood Indian Creek and Alkali Creek) may be locally important seasonal spawning and rearing areas when suitable flow conditions exist, therefore current water quality and flow regimes should be maintained.

3. Since many of the soils in this reach are highly erodible "badland" soils (which cannot be easily reclaimed with vegetation cover), road construction and pipeline crossings in the riparian zone require special attention to ensure they do not become major, chronic sources of erosion and silt.

4. Public access should be maintained for anglers.

5. Existing water quality should be maintained and not degraded by town of Drumheller effluent.

3.5.6 Forest Resources

See Corridor-Wide section, "Riparian Vegetation Management" on page 23.

3.5.7 Historical Resources

Archaeological Resources

Reaches 3, 4 and 5 contain extensive amounts of uncultivated lands and therefore surface stone feature sites are relatively common. In a provincial context, uncultivated lands are relatively rare, representing a very important remnant of the former unbroken prairie. While the significance of rare sites such as medicine wheels is undisputed, it should be noted that tipi ring sites contain important clues to past social organization and structured land use. It is therefore concluded that uncultivated lands are of particular importance from an archaeological perspective.

Reach 5 is the best studied portion of the Red Deer River. Some 1,080 archaeological sites have been recorded; 18 of these are listed on the significant sites list maintained by Alberta Community Development (again most of these consist of medicine wheels). The large number of known sites represent only surface inventory and little subsurface exploration has occurred. Site densities on this reach are considered to be exceptionally high and the potential for additional site discovery is considered to be very high.

Guidelines:

1. Community Development requests referral of any plans for improved grazing/cultivation of native prairie within 1 km of the valley breaks in reaches 3, 4 and 5.

2. Community Development requests referral of all oil and gas related activities (excluding seismic) below the valley breaks on Eastern Irrigation District (EID), Special Areas and Public Land. Similarly they request referral of all oil and gas related activities on native prairie above the valley breaks on Public, Special Areas and EID land.

3. Activities undertaken for the prospect, retrieval or examination of these resources must be conducted in such a manner that does not jeopardize the interests and livelihood of the affected landholders.

Palaeontological Resources

Drumheller to Dinosaur Provincial Park - Soon after leaving the City of Drumheller, the river enters the Upper Cretaceous Bearpaw Formation. This is a marine formation that can be recognized by its gentle hilly topography. Outcrops and fossil remains become more scarce as one enters this area. Ammonites, other invertebrates and rare vertebrate remains are found in this formation. While this formation has not been as extensively prospected or collected as the dinosaur bearing formations elsewhere, the area is considered to have high potential for the occurrence of fossil remains. Such remains may be encountered by any activity that results in significant disturbance to the bedrock.

Upstream from Dinosaur Provincial Park, the river enters the Judith River Group, another very significant dinosaur bearing unit. This area is considered to be extremely significant and any activities in the area that cross the valley breaks and/or affect the bedrock are considered to have a very high potential to encounter significant palaeontological resources.

Dinosaur Provincial Park and Surrounding Area - Dinosaur Provincial Park has long been recognized as one of the world's major sources of Upper Cretaceous dinosaur specimens. More than three hundred significant finds have been made in this area and the park is the focus of major research efforts by the Royal Tyrrell Museum of Palaeontology and other scientific institutions. In recognition of the significance of this resource, the park was designated as a UNESCO World Heritage site in 1979. In 1984, the park was also nominated (by the Geological Society of America) as one of the one hundred best geological sites in the Rocky Mountains Section. The vertebrate assemblage from the park alone comprises 130 species and when plant and invertebrate species are included, there are over 200 Upper Cretaceous, Judithian age fossil species in Dinosaur Provincial Park. Over 35 species of dinosaur are known and there are also significant quarries, bonebeds and microvertebrate accumulations of scientific importance. All activities in and around the park should be assumed to affect palaeontological resources and should be very closely monitored.

Dinosaur Provincial Park to the Saskatchewan border - This part of the river continues through the Judith River Group. A number of highly sensitive regions have been identified, especially along the South Saskatchewan River to south of the planning area. However, this section of the river has not been as thoroughly studied as the area around Dinosaur Park. Again, any activities that cross the valley breaks, and/or affect bedrock are considered to have very high potential to encounter significant palaeontological resources.

Quaternary Palaeontological Resources

Several important Quaternary localities and faunas have been identified in Reach 5. Specifically, horse, bison, camel, caribou and mammoth remains (recovered from a gravel pit on the south bank of the Red Deer River near Empress) were dated to 14,200 and 20,400 years BP. A gravel pit near Bindloss (on the north bank of the river) produced lion, mammoth and horse fossils but no radiometric date was obtained; the site was suggested to be mid-Wisconsian or Sangamon in age.

These sites are of crucial importance to Provincial Museum studies of the late Pleistocene faunas, floras, and palaeoenvironments of Alberta. As such, these sites should be protected from development until Museum personnel can resurvey the area and make appropriate collections and further recommendations.

3.5.8 Mineral Resources/Industrial Development

Objectives:

1. To have the petroleum and natural gas resources, associated with the several fields extending into the area, explored and developed.

2. To have the Drumheller coal field explored and developed.

3. To have the quarriable, metallic and industrial minerals of this reach explored and developed.

4. To permit controlled development in accordance with the Special Areas Land Use Order, while maintaining the visual characteristics of the planning area.

Guidelines:

1. Access for exploration or site development for mineral interests must not jeopardize the cottonwood community.

2. In Special Areas, exploration or development shall proceed in accordance with the SAB policy regarding setbacks from water bodies. The policy prohibits seismic drilling within the historical water lines, and well site establishment within 100 metres of the historical water lines, of named water bodies within the Special Areas.

3. Proposals for exploration or development may be required to submit for review and approval, an Access and Development Strategy. This will include, but not be limited to, long term development proposals, required infrastructure, mitigative measures for sensitive land or habitat features, and reclamation procedures.

4. Industrial development in Special Areas shall be governed by the provisions of the Special Areas Land Use Order. This document stipulates land use criteria involving landscape features such as flood plains, escarpments, slopes and water bodies.

3.5.9 Recreation and Tourism Resources

Reach 5 is a very important reach for tourism and recreation resources and opportunities. It includes unique and scenic badland landscapes, from Finnegan to north of Jenner. Among the major outdoor activities are fishing, hunting, hiking, horse riding, photography, circle tours and general landscape appreciation.

Landowners are considered key stakeholders in the local land use decision making process. Water-based recreation takes place throughout the reach but there are no campsites in the stretch from Rosedale to Emerson Bridge, and only six campsites from Emerson Bridge to the Saskatchewan border.

Significant natural features are: the Crawling Valley Complex; Douglas Creek Springs, a provincial significant habitat; the Matzhiwin Creek Dunes; Duchess Springs; Steveville Badlands (an internationally significant area with badlands, fossils habitats and scenic viewpoints); and the Dinosaur Badlands.

Culturally significant features are the Empress Tipi Rings and other aboriginal sites and remains; the Bleriot Ferry; the Old Mexico Ranch; the Historic Metis Settlement site; and the Suitor Medicine Wheel, a collection of stone features in an attractive valley.

Dinosaur Provincial Park and Dinosaur World Heritage Site is internationally significant. The site contains unique attributes: extensive badlands landscapes, major coulees and hoodoos, important fossil resources, important wildlife habitat, significant interpretive facilities such as the Tyrrell Field Station, a service centre and camping facilities. This park is a focus for recreation and tourism activities and includes scientifically based tourism/education opportunities.

Recreation and tourism development in Special Areas is subject to the provisions of the Special Areas Land Use Order. The Board encourages rational development that recognizes the needs of all landscape users.

Reach 5 of the IMP contains "recreation segments" 5, 6, 7 and 8. The instream flows required to support recreation activities in Reach 5 are described in Tables 7, 8 and 9.

Recreation Tables for "Recreation Segments" Five to Eight Within Reach Five

Table 7

Recreation Segment 5 Hwy 21 to Finnegan	Range of flows in cubic metres per second	
Activity	Min.	Max.
Wading	5	90
Tubing	5	
Canoeing	10	
Swimming	2	25
Rafting	33	
Power Boating	60	

Table 8

Recreation Segment 6 Finnegan East to Boundary of Dinosaur Park	Range of flows in cubic metres per second	
Activity	Min.	Max.
Wading	4	100
Tubing	5	
Canoeing	19	
Swimming	1	12
Rafting	30	
Power Boating	62	

Table 9

Recreation Segments 7 & 8 East Boundary of Dinosaur Park to Saskatchewan	Range of flows in cubic metres per second	
Activity	Min.	Max.
Wading	4	100
Tubing	4	
Canoeing	16	
Swimming		12
Rafting	28	
Power Boating	63	

Objectives:

1. To accommodate the unique river travel experience and water based recreation opportunities along this reach of the Red Deer River.

2. To encourage, at the local level (private sector), the development and stewardship of campsites, at such places as Finnegan Ferry (SH-862), and Dorothy (SH-848), or East Coulee (SH-569).

3. To continue to manage Dinosaur Provincial Park to serve as a major tourist attraction through continuation of interpretive programs and existing facilities.

4. To encourage, at the local level, the development of water-based interpretive tour experiences.

5. To accommodate valley and river access through formally designated sites (e.g. highway river crossings) or agreements with the occupants of the land.

6. To recognize the stretch from Alkali Creek to Empress as having importance as an environmentally significant area with opportunities for interpretation and appreciation of the prairie landscape.

7. To highlight the unique river travel experience through badlands landscapes and riparian forest from Finnegan to north of Jenner, and to enhance water-based recreation along the lower Red Deer River.

8. To encourage the development of formal water access sites for canoeists.

3.5.10 Residential Development

Objective:

1. To facilitate controlled development that does not jeopardize the aesthetic qualities of the river valley. Developers should be encouraged to build in such a manner that harmonizes with the visual characteristics of the surrounding landscape.

Guidelines:

1. All developments shall be in accordance with the *Special Areas Land Use Order*. This planning document provides regulations for developments near water, flood plain developments, parcel size and location.

2. Developments shall utilize non-contaminating sewage facilities. Access should be from existing developed road right of ways. All setback requirements from water shall be strictly enforced.

3.5.11 Surface Materials

Objective:

1. To permit controlled development in accordance with the Special Areas Land Use Order, while maintaining the visual characteristics of the planning area.

   - for other jurisdictions, see Corridor-Wide objectives on page 36

Guideline:

1. In Special Areas, the SAB, through its mandate for provision of Municipal Services, may be obliged to obtain sources of aggregate within the planning area. Sand and gravel operations shall be undertaken in accordance with the Energy Prairie guidelines and in a manner that minimizes the visual impact to surrounding landscape features.

   - for other jurisdictions, see Corridor-Wide guidelines on page 36

3.5.12 Transportation Infrastructure

Objective:

1. To maintain the economic integrity of ranching units, as unsevered by new transportation corridors.

Guideline:

1. Road alignment shall recognize the negative impact of severing parcels within ranching units. This practice is strongly discouraged.

3.5.13 Wildlife Resources

Approximately the first 50 kilometers of reach 5 is in the mixed grass prairie ecoregion and the rest flows through the short grass ecoregion. The topography through most of this reach consists of badland river breaks which contribute a great habitat diversity. On the river flats, two prominent habitat types are cottonwood groves and sage flats.

The topography of the river breaks is important for wintering and escape cover for many species. The steep breaks provide nesting for raptors including golden eagles, ferruginous hawks (threatened status), prairie falcons and peregrine falcons (endangered status). The breaks also have eroded holes which are used as snake hibernacula.

Cottonwood groves are used by birds for nesting and they also provide forage and cover for wild mammals. The cottonwoods are also important for migrating passerines and as migration corridors for ungulates. The river islands, which are generally covered by willows and cottonwoods, are very important for cover and food for ungulates and birds. In Dinosaur

Provincial Park, 707 pairs of breeding birds were recorded in 40 hectares of cottonwood forest. This involved 31 species of birds (Savoy, 1991).

Sage flats habitat are important wintering areas for pronghorns. In the winter, the pronghorn's diet is predominantly sagebrush (Mitchell, 1980). Sagebrush habitat is also used extensively by nesting birds. A study in Dinosaur Provincial Park recorded 256 pairs of breeding birds in 40 hectares of sage brush. This involved 10 species of birds (Savoy, 1991).

Objectives:

1. To maintain undisturbed wintering areas for large ungulates (i.e. river breaks, cottonwood forests and sage flats).

2 Provide travel corridors for all wildlife species.

3. Maintain snake hibernacula.

4. Allow the cottonwood forests to continue their ecological cycle and, where feasible, enhance replenishment opportunities.

Guidelines:

1. Identify areas important to wildlife and provide input through the referral process for the protection of those areas.

2. Ungulate wintering areas should be maintained with consideration of agricultural objectives and guidelines.

3. Proposals for agricultural and industrial developments will consider the impact to sage flats and avoid habitat loss wherever practical.

4. Industrial development proposals in Special Areas shall include a minimum 100 metre setback from the river and the valley's break of slope.

5. Residential development proposals shall include a minimum setback of 100 metres from the break of slope and 38 metres from the river.

6. Additional road access shall be evaluated for impact to important wildlife habitat.

7. Developments will not involve removal of healthy cottonwood growth.

8. Work with partners to enhance cottonwood forests.

9. Road developments should conform to the natural topography of the landscape to the greatest extent possible.

10. Special consideration should be given to development setbacks on the top and bottom of the river breaks with historical, present or potential raptor nesting sites and where important ungulate wintering habitat exists (100 metres is recommended).

Red Deer River Corridor Integrated Management Plan

Technical Background Document

Background Information on Special Areas

History

The Special Areas was formed in 1938 under the *Special Areas Act*. This was in response to the dissolution of thirty-seven municipalities that were forced into receivership during the drought of the 1930s. The Special Areas, located in the southeastern portion of Alberta, covers in excess of 5 million acres of semi-arid, undulating terrain.

The Special Areas is unique due to recurring drought cycles. These climatic aberrations form a foundation for the rural lifestyle prevalent in the Special Areas Community. The residents have endured great hardships and become very resourceful in their efforts to sustain the productivity of the land. A close relationship with the land allows the community to derive a livelihood from generation to generation.

Authority

The Special Areas is unique inasmuch that the ***Special Areas Act*** makes provisions for the Special Areas Board to manage the rangeland, farmland and general land use by programs designed to rehabilitate the area. The Act facilitates utilization of certain portions of the *Public Lands Act* and the *Municipal Government Act*.

These Acts, with their subsequent Regulations and Policies, provide the framework for land use and development activity within the Special Areas.

Mission Statement

Special Areas Board is dedicated to improving the quality of life of the residents of the Special Areas through the provision of cost-effective, responsive municipal services and effective long-term land resource management.

Guiding Principles

To provide a basis for implementing the intent of the *Special Areas Act*, its subsequent Regulations and operational policies, the Board has developed a set of key principles by which land resources are managed. They are as follows:

- STEWARDSHIP

The people of the Special Areas value the prairie as a resource worth protecting. It is the basis of the livelihood of a majority of the landholders. It is a resource that we want to exist for future generations.

- CUSTODIAN

We believe that land must have a custodian. Without someone with a vested interest in the land watching over it, abuse could result from activities of the public at large and other users.

- CONSERVATION

Grazing is compatible with conservation, provided that the rancher carries out good range management practices.

- LAND USE

We do believe in multiple use and working out land use conflicts on site with common sense solutions, and with the input of disposition holders.

Strategic Philosophy

The Special Areas Board's philosophy regarding the health of rangeland is to support land use activities that sustain the long-term well-being of the ecosystem while providing social, economic and environmental opportunities for the benefit of existing and subsequent generations.

The Special Areas Board (SAB) supports multi-party land use. The Board believes in working out land use conflicts, on site, with common sense solutions and with input of disposition holders. The SAB's philosophy regarding land and resource use in the Corridor is to support activities that sustain the long-term well-being of the ecosystem, while providing social, economic and environmental opportunities for the benefit of existing and subsequent generations.

The SAB management process involves broad, holistic ecosystem processes. Less focus is placed upon specific species proliferation or preservation. However, all are recognized as important indicators of the general health of the bioscape. Significant departures from equilibrium can indicate potential problems. The Board has been involved in numerous species-specific conservation projects in an effort to facilitate the interests of researchers, other government agencies and the local community.

Sustainable land use management applies equally to agriculture, recreation, mineral resource development and transportation.

Activities

Within the Special Areas there exists a multitude of activities that comprise the municipal community. We recognize that some activities contribute more to the sustainability of the prairie and some are more closely geared to economic development and maintaining the financial dimension of the community. It is between these activities that the Board constantly strives to achieve a balance.

Public land within the Special Areas is under the administration of the Minister of Municipal Affairs. The *Special Areas Act* defines the parameters for administration with a focus upon economic stability and conservation of land resources. There are a number of programs and activities mandated through the Minister to the Special Areas Board. The **key areas include** agriculture, mineral resource development, recreation and transportation.

The Act provides the Minister, as Council for the Special Areas, with authority to utilize the land in such a manner that benefits the residents. This is accomplished under accepted practices that do not jeopardize the integrity of the land. Agriculture and natural resource development are pursued with a foremost conservation ethic.

The Regulations supporting the *Special Areas Act* specifically define the intent and criteria under which the Minister wishes the Special Areas to operate. The Regulations provide guidelines from which the Special Areas Board has developed operational policies.

The Board's policies have been established to develop linkages between the socio-economic and environmental needs of the stakeholders and their relationship to the land from which they derive their livelihood. The Board has developed land use policies that support conservation, which helps maintain range condition and reflects sound landscape management.

The Corridor supports a mixture of patented and public land. Within this mixture, we find activities within the key areas of ranching, farming, oil and gas development, residential and industrial development, recreation and transportation.

Within these activity areas, the SAB defines management policies, often in partnership with the actual stakeholders, involving the resource issues as presented in the Terms of Reference for this river corridor. The policies have been developed to address the needs of the entire Special Areas; however, they are equally applicable to the Corridor planning area.

Management Parameters

Ranching is the dominant agricultural activity in the Special Areas as well as the Corridor. Grazing leases provide for long-term pasturing of livestock, forage and habitat management. The land lease structure promotes the concepts outlined under the guiding principles of the Special Areas Board. Conservation, custodianship and stewardship are the basis of theses principles that ensure sustainable grazing lease management.

In support of the **grazing lease system,** the Board has developed policies for:

- Established livestock carrying capacities to ensure the correct balance of grazing and residual plant litter.
- Lease inspections to monitor stocking rates and plant condition.
- Range improvement: extension work and management plans supervised by resident Agrologist, as a tool to improve ranch economics and range condition.
- Regrassing areas of abandoned cultivation or depleted stands of tame forages.
- Use of certified seed only for regrassing.
- Water development credit to lease rent - as a stock distribution incentive.
- Prohibited commercial sales of hay from grazing leases - encourages stewardship of the land.
- Lessees stock only on lease. This ensures the custodian takes responsibility for livestock activity.
- Permits for harvesting of native plant seed.

To a lesser extent, **farming provides** cash flow through cereal and oilseed crop production. The Special Areas Board issues long-term cultivation leases on the better lands designated under the CLI for Agriculture. There are **several policies** in place governing Cultivation Lease activity. They are as follows:

- No cultivation of native prairie.

- Farming methods to be in accordance with the Soil Conservation, Weed Control, and Agricultural Pests Acts.

- Maintain an active Agricultural Service Board (ASB) and Agricultural Fieldman to promote farm cultural practices and good range management. The ASB is charged with delivering agricultural technology that directly links conservation strategies to economic food production.

- Extension programs and demonstrations are key functions of the ASB.

- Enforcement is present, however it plays a minor role as lessees are recognized as responsible stewards of the land.

There are extensive tracts of land within the Special Areas for which the highest and best use is grassland pasture. This concept is supported by the residents at large. There is no significant pressure to cultivate native prairie.

In recognition of this conservationist ethic, the SAB has placed a moratorium on issuing new cultivation leases since 1981.

The SAB adopted a policy of **cooperation with PFRA** during the active phase of their marginal land conversion. There were approximately 110,000 acres regrassed in the Special Areas under this initiative.

Other partnership programs with PFRA include:

1. Hydrogeological studies and aquifer mapping to determine sustainable water sources.

2. Deep groundwater exploration to groundtruth hydrogeological information.

3. Water pipelining to provide towns, villages, and hamlets with a dependable, potable water supply.

The SAB has an **Exchange of Land** policy whereby landholders may apply to exchange patent land for public land. Over time, the SAB has transferred many cultivated lease parcels in exchange for native rangeland. This exchange program has revested a number of acres back to the Crown and ensures a stable land base for valuable prairie resources.

Oil and gas development: This activity is often cited as being a significant contributor to disturbance on rangeland. The Board recognizes the impact of oil and gas access on people and their environment.

Policies that attempt to minimize the impact to each environmental element (air, hydrology [water], land) and its associated habitat features are as follows:

1. Minimum disturbance on native prairie.

2. Preclusion of seismic drilling on water bodies.

3. Preclusion of well site establishment within 100 metres of water bodies.

4. Native seed in reclamation of prairie sites.

Two **noteworthy policy considerations** are:

1. The need to protect wildlife and specialized plant habitat.

2. The need to avoid the potential for mixing or contamination of the various water zones.

The Special Areas Board is very serious about minimizing the surface impact of oil and gas development, while not unduly infringing upon the rights these commercial ventures have purchased from the provincial government. In recognition of the sensitive areas scattered throughout the Special Areas, the Board was instrumental in developing reasonable operating guidelines for PNG activity on native prairie.

These guidelines were subsequently released as the **"ERCB Guidelines to Petroleum Activity on Native Prairie."** They form the basis of oil and gas surface access policies within the Special Areas. The SAB could not have achieved the degree of reduced impact to the prairie without innovations and leadership from industry. Industry has achieved a balance between industrial development and

maintaining the prairie environment. Additionally, developers recognize the benefits of pad drilling for multi-wells. The concept of minimum disturbance translates into time and dollars saved at the reclamation phase of operations.

The SAB provides a local member to assist in the release of land through the **Reclamation Certification** process. The member is selected from the community at large and the individual uses his empirical knowledge in evaluating the success of reclamation, on a per site basis.

The resident Agrologist is instrumental in recommending varieties of **native compatible seed for reclamation purposes**. Again, industry has been very cooperative in adopting seed mixtures that fit into the prairie plant complex.

Residential and industrial development is subject to the provisions of the Special Areas Land Use Order. The Municipal Planning Commission is a combination of appointed and elected members. They refer directly to the Land Use Order when deciding upon Development Permits. The purpose of the Order is to regulate the use and development of land to achieve orderly and economic development of land within the Special Areas.

Land development has an impact upon the existing habitat and economic communities. The Board encourages **rational development that recognizes the needs of all landscape users**. Land development in the Special Areas takes a common sense approach to mitigate disturbance to native range, including riparian areas and better agricultural land.

The **recreational dimension** in the Special Areas facilitates many interests. Among the major outdoor activities, we find pursuits in fishing, hiking, hunting, horse riding, photography, circle tours and general landscape appreciation.

Recreation is generally accepted as having limited, but detectable impact on the land. Participants are encouraged to recognize the sensitivity of the enviroscape as they engage in their pursuits.

Recreational pursuits remain without controls because of the success of cooperation between the participants and the landholders. The custodians of the land provide a balance to land use intensity at the local level. Stakeholders with a vested interest in the land accept the responsibility of ensuring the legacy can be passed on to future generations.

Recreationists are encouraged to accept the common sense limitations to their activities as established by the sensitivity of the land.

The **transportation infrastructure** in the Special Areas has developed from a market-based need. The SAB recognizes that industry and agriculture must move their products to market areas in order to survive. The Board's road development philosophy supports development only as necessary. The SAB, as the municipal road authority, does not build roads on every road allowance. In fact, the majority of road allowances within the Special Areas remain closed by Ministerial Order. Closed road allowances limit the Minister's liability in the event of a mishap; however, these road allowances are available for public use at their own risk.

The current practice of road construction is to follow the existing topography, as opposed to cutting through hills with the associated wider backslopes. Oil and gas developers are encouraged to use existing road allowances wherever feasible, and to adhere to the minimum disturbance policy if they must cross prairie. Transportation for farm and ranch use generally incorporates a network of trails that are not developed to municipal standards, however, they are adequate for local use.

The SAB is presently more focused upon road maintenance than on an in-depth, new road construction program.

The SAB recognizes the presence and needs of wildlife within the Special Areas. The Corridor presents unique and critical habitat for a number of species. The Board has maintained a positive working relationship with fisheries and wildlife staff of Alberta Environment. Although agriculture is viewed as a priority activity, the SAB recognizes the mutual benefit generated by maintaining a healthy agri-ecosystem.

Wildlife habitat

The SAB cooperates on a number of **wildlife and habitat research projects,** some of which extend beyond the planning area.

Examples include the following:

- Hawk and owl habitat - Joe Schmutz, University of Saskatchewan.
- Leopard frog ecology and habitat - Fish and Wildlife Division of Environmental Protection, Ducks Unlimited and the World Wildlife Fund.
- Chestnut-collared longspurs ecology and habitat - Dorothy Hill, University of Alberta
- Loggerhead shrike ecology and habitat - Douglas Collister, University of Calgary
- Piping plover habitat - Natural Resources Service, Alberta Environment.
- Sharptail grouse ecology and habitat - Natural Resources Service, Alberta Environment.

Conclusion

The Special Areas Board, through its mandate under the *Special Areas Act*, and in accordance with its established guiding principles, supports and advocates its strategic philosophy to sustain the long-term well-being of the prairie ecosystem while facilitating the necessary socio-economic dimensions of the local community. The residents of the Special Areas have been recognized for their efforts in sustaining the prairie through receiving the Order of the Bighorn (1990) and the Prairie Conservation Award (1994).

Through consultation with stakeholders, partnerships are formed and issues resolved using common sense solutions that are within the participants' ability to budget. The prevailing rural ethic contributes largely to the sense of pride and community roots that are found within the Special Areas. Conservation is not a buzz word in the Special Areas, it is a way of life.

Alberta Ambient Air Quality Guidelines

January 1997

The Environmental Protection and Enhancement Act (EPEA) provides for the development of guidelines and ambient environmental quality objectives for all or part of Alberta.

Background

Prior to EPEA, ambient air quality was addressed within regulations under the Clean Air Act. These regulations were developed to assess air quality and to assist in setting source emission standards in approvals. When interpreting guidelines or objectives for the purpose of setting emission standards, statistical methods and atmospheric dispersion modelling are employed to establish limits, which ensure protection of the ecosystem.

The status of air quality at any location can be determined by comparing measured or calculated values to those specified in the guidelines.

The Review Panel on Environmental Law Enforcement in Alberta recommended that the ambient air quality regulations contained in Part 1 of the Clean Air (Maximum Levels) Regulation (AR 218/75) be repealed and be replaced by a comprehensive set of objectives.

Overview

In 1994, following a review of the Clean Air (Maximum Levels) Regulation and other department documents, Environmental Protection carried these values forward as the Alberta Ambient Air Quality Guidelines. Table 1 summarizes the Guidelines.

Environmental Protection, in setting guidelines and emission standards, has and will continue to use provincial, federal and international guidelines and objectives where appropriate. However, situations may arise where Alberta requires a new/updated guideline or objective for a compound of concern. These will be established under Section 14(1) of EPEA following public and stakeholder consultations.

Ambient air quality will continue to be protected; levels of protection will not diminish, and new guidelines/objectives will be added as required. As in the past, enforcement action will be based on non-compliance with the Act, regulations or approval conditions.

Public Review

Consultation will be a part of the process of updating or developing new Alberta Ambient Air Quality Guidelines consistent with Part 1, Section 19 of EPEA. Environmental Protection will involve key stakeholders such as the general public, public interest groups, the scientific community, municipalities and industry in this process.

Definitions

Various definitions are used in the field of air quality. To ensure consistent use of terminology, the following definitions are adopted:

Criteria - Scientific data evaluated to derive a cause and effect relationship.

Criteria are generally published data of studies of effects of air contaminants on vegetation, materials or human health.

Guideline - Numerical concentration, value or narrative statement intended to prevent deterioration of air quality. A guideline is based on criteria.

A guideline is generally derived from the lowest observable effect level on the sensitive receptor. Alberta Environmental Protection's Air Monitoring Directive lists many of the air quality guidelines currently in use.

Objective - Numerical concentration, value or narrative statement intended to provide a specified level of protection in a given airshed or region of the province.

Site specific conditions determine how an objective would be developed. The objective established for a specific region will depend on existing air pollution levels, future emissions and on the most sensitive receptor.

Standard - An objective that is recognized in enforceable environment control laws of a level of government.

An example of a standard is a restriction of the amount of emission rate of an air contaminant present in a gaseous effluent discharged to the atmosphere. These are noted as 'source standards', which are specified in approvals.

For more information, please call:

Alberta Environment
Environmental Assessment Division
Phone: (780) 427-6270
Fax: (780) 427-9714

Table 1

Alberta Ambient Air Quality Guidelines

Air Quality Parameter	Guideline
Sulphur Dioxide [1]	• 450 micrograms per cubic metre as a 1-hour average concentration • 150 micrograms per cubic metre as a 24-hour average concentration • 30 micrograms per cubic metre as an annual arithmetic mean
Hydrogen Sulphide [1]	• 14 micrograms per cubic metre as a 1-hour average concentration • 4 micrograms per cubic metre as a 24-hour average concentration
Nitrogen Dioxide [1]	• 400 micrograms per cubic metre as a 1-hour average concentration • 200 micrograms per cubic metre as a 24-hour average concentration • 60 micrograms per cubic metre as an annual arithmetic mean
Carbon Monoxide [1]	• 15 milligrams per cubic metre as a 1-hour average concentration • 6 milligrams per cubic metre as an 8-hour average concentration
Ground Level Ozone [1]	• 160 micrograms per cubic metre as a 1-hour average concentration • 50 micrograms per cubic metre as a 24-hour average concentration
Suspended Particulates [1]	• 100 micrograms per cubic metre as a 24-hour average concentration • 60 micrograms per cubic metre as an annual geometric mean
Dustfall [1]	• 53 milligrams per hundred square centimetres per 30 days in residential and recreation areas • 158 milligrams per hundred square centimetres per 30 days in commercial and industrial areas
Coefficient of Haze	• 90% of the readings per month shall be less than 1.0 COH unit
Ammonia [2]	• 2.0 pm as a 1-hour average concentration
Static Total Sulphation [3]	• 0.50 mg SO3 equivalent/day/100 sq cm as a 1-month accumulated loading
Static Hydrogen Sulphide [3]	• 0.10 mg SO3 equivalent/day/100 sq cm as a 1-month accumulated loading
Static Flourides [3]	• 40 ug water soluble flourides/100 sq cm/30 days

1 Clean Air (Maximum Levels) Regulation (218/75).
2 Guidelines for Limiting Contaminant Emissions to the Atmosphere from Fertilizer Plants and Related Industries in Alberta.
3 Air Monitoring Directive, Alberta Environmental Protection.

NOTE: Persons making use of this Fact Sheet are reminded that it contains summary information only and has no legislative sanction. The original documents should be consulted for all purposes of interpreting and applying the law.

Published Guidelines for Residential Development

The following guideline documents have been published by the province (one federal) to address residential subdivision development. These publications are **not** regulations and thus have no enforceability unless adopted by a local authority. The guidelines can be used by the local authority to assist in the generation of appropriate subdivision criteria.

A. *Interim Guidelines for the Subdivision of Land Adjacent to Steep Valley Banks*[1]

B. *Interim Guidelines for the Subdivision of Land in Areas Adversely Affected by River Flooding and Erosion*[1]

C. *Interim Guidelines for the Evaluation of Water Table Conditions and Soil Percolation Rate for Unserviced Residential Subdivisions*[1]

D. *Interim Guidelines for the Evaluation of Groundwater Supply for Unserviced Residential Subdivisions Using Privately Owned Domestic Water Wells*[1]

E. *Code of Practice for the Safe and Economic Handling of Animal Manures*[2]

F. *Canada-Alberta Flood Damage Reduction Program*

G. *Problem Lands - building in a Flood-Risk Area (federal publication)*

1. Alberta Environment, Source Standards Branch, 6th floor, Oxbridge Place, 9820-106 Street, Edmonton, Alberta, T5K 2J6, Telephone: (403) 422-2540

2. Alberta Agriculture, Food and Rural Development, Animal Waste Management Engineer, 3rd Floor, Provincial Building, 4920-51 Street, Red Deer, Alberta, T4N 6K8, Telephone: (403) 340-7607

Legislative Responsibilities of Provincial Government Departments Involved in Management of Red Deer River Corridor Resources

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Department of Agriculture, Food and Rural Development

- Agricultural Operation Practices Act
- Agricultural Pests Act
- Agricultural Service Board Act
- Agricultural Societies Act
- Agriculture Financial Services Act
- Animal Protection Act
- Bee Act
- Brand Act
- Federal-Provincial Farm Assistant Act
- Horned Cattle Purchases Act
- Irrigation Act
- Line Fence Act
- Livestock Diseases Act
- Livestock Identification and Brand Inspection Act
- Livestock Industry Diversification Act
- Livestock & Livestock Products Act
- Marketing of Agricultural Products Act
- Meat Inspection Act
- Soil Conservation Act

Department of Environment

- Environmental Protection and Enhancement Act
- Fisheries (Alberta) Act
- Forest and Prairie Protection Act
- Forest Reserves Act
- Forests Act
- Natural Resources Conservation Board Act
- Provincial Parks Act
- Public Lands Act
- Water Act
- Wilderness Areas, Ecological Reserves and Natural Areas Act
- Wildlife Act

Department of Municipal Affairs

- Agricultural and Recreation Land Ownership Act
- Alberta Housing Act
- Municipal Government Act
- Special Areas Act

Department of Resource Development

- Alberta Energy and Utilities Board Act
- Coal Conservation Act
- Coal Sales Act
- Energy Resources Conservation Act
- Freehold Mineral Rights Tax Act
- Gas Distribution Act
- Gas Resources Preservation Act
- Gas Utilities Act
- Mines and Minerals Act
- Rural Electrification Long Term Financing Act
- Rural Utilities Act

Department of Community Development

- Alberta Sport, Recreation, Parks and Wildlife Foundation Act
- Historical Resources Act
- Recreation Development Act

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Draft Red Deer River Corridor Integrated Management Plan

- Fall 1999 -

Comment Sheet

We would appreciate your feedback on the *Draft Red Deer River Corridor Integrated Management Plan* (IMP). Please provide us with your comments and submit them to the address provided at the end of the form (or leave at the open house registration desk).

1. ***There has been discussion about the best boundary to use for the Red Deer River Corridor Planning Area. The original proposal was to include lands within 5 km (3 miles) on each side of the river. The current boundary is the valley break-of-slope to a maximum distance of 3 km from the river.***

   Please indicate what you feel is the most appropriate boundary to use (feel free to provide alternatives to the two suggested above).

2. ***Please list any parts of the plan that you strongly support and briefly explain why.***

3. ***Please list any parts of the plan that concern you and explain why.***

....ov

4. ***What suggestions do you have for improving the plan?***

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5. ***Use this space to provide any further comments that you may have regarding the Draft IMP.***

_____

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_____

6. ***What is your primary interest in the planning area?***

Agriculture _____ Forestry _____ Tourism _____

Recreation _____ Preservation/Conservation _____

Industry (*please specify*) _____

Other (*please specify*) _____

Thank you for taking the time to provide us with your comments on the Draft IMP. If you would like to receive follow-up information regarding this public review, please provide your name and address to be added to our mailing list:

(By providing this information, you give permission to be on future Alberta Environment mailing lists)

Name: _____

Address: _____

_____

_____

_____

Please mail or fax this form (by January 14th, 2000) to:

Terry Krause, Alberta Environment
3rd floor, Provincial Building
4920 - 51 Street, Red Deer, AB T4N 6K8
Phone (403) 340-4979 Fax (403) 340-5173 terry.krause@gov.ab.ca

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